DOCUMENT RESUME

ED 167 813	CE 020 286

TITLE	Training Program for Operation of Emergency Vehicles. Instructor Lesson Plans.
INSTITUTION	INNOVATRIX, Inc., Ingomar, Pa.
SPONS AGENCY	National Highway Traffic Safety Administration (DOT), Washington, D. C.
REPORT NO	DOT-HS-802-564
PUB DATE	Oct 78
CONTRACT	DOT-HS-6-01336
NOTE	772p.; For related documents see CE 020 285-286
AVAILABLE FROM	Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402 (Stock Number 050-003-00332-8)
EDRS PRICE	MF05/PC31 Plus Postage.
DESCRIPTORS	Behavioral Objectives; Course Content; Course Objectives; *Driver Education; *Emergency Squad Personnel; Learning Activities

ABSTRACT

Unit lesson plans for the three parts of the Emergency Vehicle (EV) Operator training program are provided. The units in parts 1 and 2 are designed for use in a classroom setting and contain the following components: description of the unit; trainees' knowledge objectives; instructor preparation activities; instructional content/presentation guidelines, and review exercises. Part 1 contains seven units, organized into twenty-one subunits or modules, and includes the following topics: course introduction, the legal aspects of EV operation, selecting routes and reporting emergency operations, preparing to drive an EV, important physical forces and EV control, operating an EV, and handling unusual driving situations. Part 2 contains three units (six modules), one of which is to be taken by each trainee: operation of law enforcement vehicles, operation of ambulances, and operation of fire apparatus. Part 3 provides in-vehicle practice exercises for the type of vehicle the trainee will drive. Contained in this unit are the following components: description of the unit; trainee performance objectives; instructor preparation activities; small area exercises (Dutton's Weave, stall parking, turnabouts), range exercises (evasive maneuver, serpentine course, Baird's Judgment, lane change, controlled braking, decreasing-width track), and skid-pad exercise. Each exercise contains a description of the exercise, procedures, possible performance problems, and criteria for excellent rating. (A bibliography and masters for transparencies are provided in the appendixes). (JH)

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ED167813

CE 020 286

Training Program for Operation of Emergency Vehicles

INSTRUCTOR LESSON PLANS

U.S. DEPARTMENT OF HEALTH,
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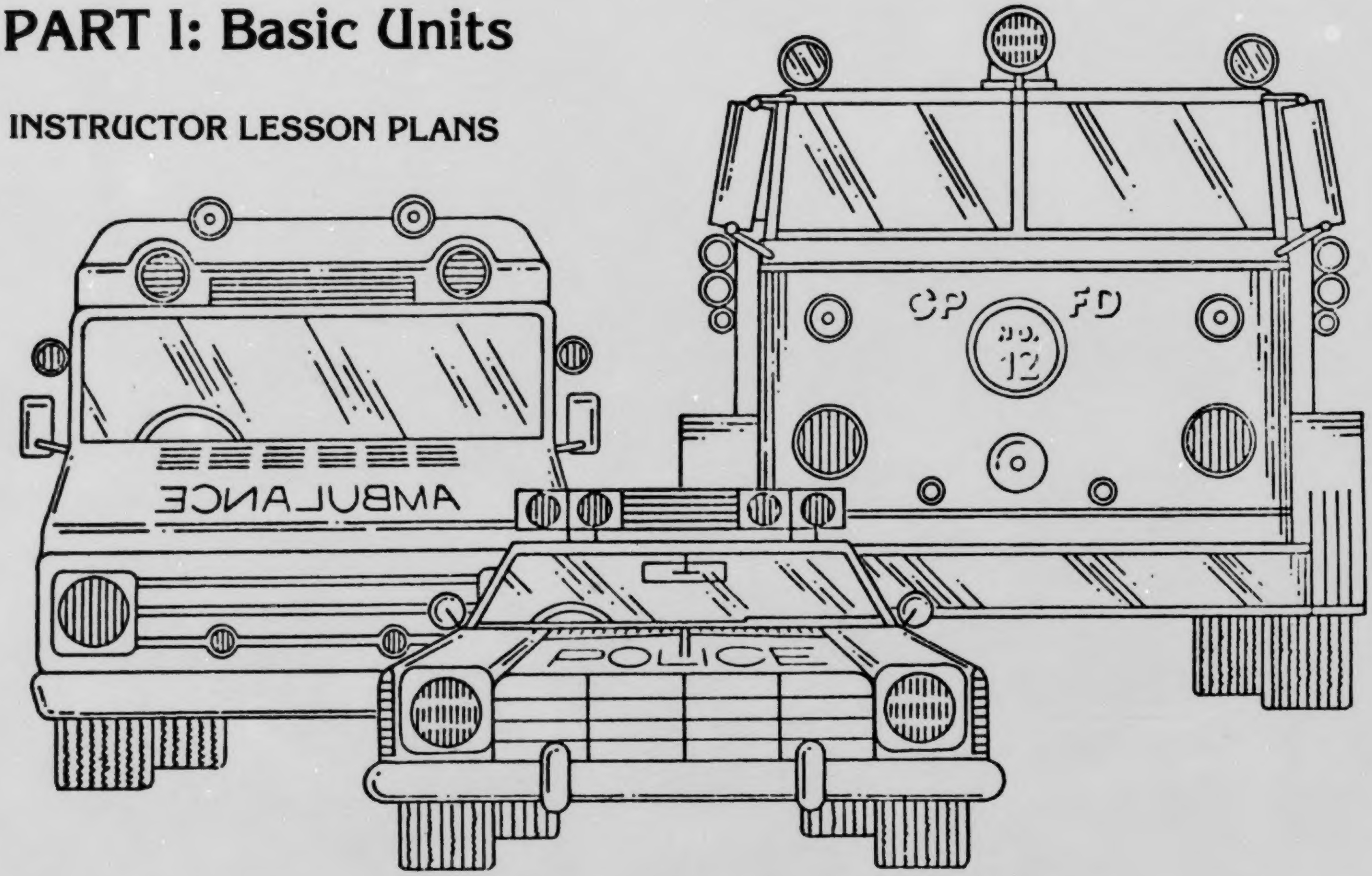
U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

Training Program for Operation of Emergency Vehicles

PART I: Basic Units

INSTRUCTOR LESSON PLANS


AMBULANCE
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ADDENDUM

to

TRAINING PROGRAM FOR OPERATION OF EMERGENCY VEHICLES

INSTRUCTOR LESSON PLANS

DOT HS 802-564

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ADDENDUM
to
TRAINING PROGRAM FOR OPERATION OF EMERGENCY VEHICLES
INSTRUCTOR LESSON PLANS

The Instructor Lesson Plan of the "Training Program for Operation of Emergency Vehicles" contains a full discussion of Pursuit Driving in the classroom unit entitled "Operation of Law Enforcement Vehicles;" however, no In-Vehicle Practice Exercise in High Speed Pursuit Driving is included in the range exercises, Part III.

In response to an identified need, a purchase order has now been initiated for the development and preparation of a one-lesson unit, as an addendum to Part III of the Instructor Lesson Plan of the "Training Program for Operation of Emergency Vehicles," which will specifically address In-Vehicle Practice Exercises in High-Speed Pursuit Driving for Law Enforcement Personnel. It is anticipated that this effort will require at least 60 days to develop and prepare. Review, publication, and shelf-stocking will be accomplished as quickly as possible after receipt of the material. This additional lesson unit may be ordered from GPO.

Inquiry regarding availability status of the In-Vehicle Practice Exercises in High-Speed Pursuit Driving for Law Enforcement Personnel may be addressed to:

Manpower Development Division, NTS-22
National Highway Traffic Safety Administration
400 7th Street, SW
Washington, D.C. 20590

FOREWORD

This document is one of three in the Emergency Vehicle Operation (EVO) Curriculum; they are:

1. Course Guide--Training Program for Operation of Emergency Vehicles.
2. Instructor Lesson Plans--Training Program for Operation of Emergency Vehicles.
3. Trainee Study Guide--Training Program for Operation of Emergency Vehicles.

These documents were prepared for the U.S. Department of Transportation, National Highway Traffic Safety Administration (NHTSA) under contract no. DOT-HS-6-01336 by INNOVATRIX, Inc., Ingomar, PA.

The NHTSA Contract Technical Manager was Dr. C. Harding Veigel and, in the final months of the development effort, Mrs. Dorothy McKinney. Other NHTSA personnel who made significant contributions to the development of this curriculum were John Anderson, Richard Frederick, and Robert Motley. The assistance of all of these individuals is gratefully acknowledged.

Some of the others who contributed their time and expertise were: Dr. Aaron Adams, Cecil Arnold, and Dr. George Palmer of NHTSA; Norman Darwick, International Association of Chiefs of Police; Donald Flinn, International Association of Fire Chiefs; Richard Tippy and James Grisham of the National Safety Council; and Harold Rice, Pennsylvania State Police Academy. For those whom we have failed to mention: our appreciation and apologies.

And, our special thanks to the following people:

Chief Patrick McCabe, McCandless Township Police Department, who contributed his time and allowed the INNOVATRIX staff to interview and observe his officers while they operated their patrol and ambulance vehicles.

Fire Chief Kennelly, who assisted us in setting up observations and interviews with several stations of the City of Pittsburgh Fire Department.

Ron Kane, our primary Pilot Test classroom instructor. Ron helped develop the police materials, taught them at the Pilot Test, and presented the entire basic program very effectively.

Anthony Bizjak, who ably presented the fire service materials at the Pilot Test. Tony's knowledge of fire service vehicles and policies greatly assisted us in developing the fire service material.

John Kinzer, who presented the ambulance materials at the Pilot Test and loaned his company's vehicles for the range exercises.

Officer Mitchell, Spc. Ownby, and Spc. Butler, the Huntsville Police Academy driving instructors who pilot-tested the new program and provided excellent in-vehicle instruction. They guided our fire and ambulance range instructors and kept a fine sense of humor through the pressure of the Pilot Test (an accomplishment in Alabama in July).

Finally we would like to extend our special thanks and gratitude to:

The City of Huntsville--which may have some of the finest people in the world and certainly has the most cooperative administrators this staff has ever worked with.

Our Pilot Test trainees--who pitched in, learned a lot, and offered innumerable insights and suggestions which led to the improvement of the program.

Officer Danny Barnes, Director of the Huntsville Police Academy and head of the fine Evasive Driving Program at Huntsville, Alabama. Officer Barnes was the take-charge man who smoothed administrative matters so much that most of them were never noticed by the staff. He not only made the Pilot Test fun, but also became a true and lasting friend.

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INTRODUCTION TO THE INSTRUCTOR LESSON PLANS

Purpose of the Instructor Lesson Plans

The Instructor Lesson Plans (ILP) have been prepared for the U.S. Department of Transportation, National Highway Traffic Safety Administration, to assist instructors in conducting a five-day training program for Emergency Vehicle Operators*. The ILP contains detailed plans for each unit of the course, including plans for the practical (in-vehicle) portion of the course.

The ILP is meant to be used in conjunction with the Trainee Study Guide (TSG). The TSG serves as both a text and a workbook for the trainees. Ample space is provided for trainees to take notes and answer questions.

Objectives of the Course

This course was developed to help ensure a comprehensive, basic level of training for emergency vehicle operators throughout the country. Specific instructional (knowledge) objectives for each unit appear at the beginning of each unit.

Description of the Course

This course is divided into three parts. Units A through G (Part I) consist of materials suitable for all emergency vehicle operators--regardless of service affiliation or type of vehicle that will be operated on the job. Differences due to vehicle type are noted in the text.

Part II appears in three distinct forms; one intended for use by police, one for fire personnel, and one for ambulance and rescue vehicle operators. The materials presented in these units are service-related. The service to which each unit relates is noted in the block at the bottom of each page of Part II.

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*Including police, fire, ambulance, and rescue vehicle operators.

Part III consists of practical, in-vehicle training to be conducted on a driving range or other area suitable for such activity (e.g., abandoned airport runway). Included in this section are guidelines for setting up the driving range for the three different classes of vehicles (sedans and station wagons, vans and modules, and larger trucks such as fire apparatus). Guidelines for conducting the training, including safety precautions, etc., are also covered in this section.

All of the training in Part III of the course is vehicle-related. Consequently, trainees should be divided into groups based upon the type of vehicle they will drive on the job, regardless of service affiliation. For example, police officers who will drive riot-control vans would be in the same group with modular-ambulance operators.

Using the Instructor Lesson Plans

Before you conduct your first class, you will need to read over the entire ILP, preferably several weeks before the course begins. A day or two before the course begins, you will again need to review the materials to make sure your preparation is complete. A secondary reason for this advance preparation is to enable you to keep the course on schedule. You will be able to avoid lengthy discussions about materials that will be covered later; your preparation will let you know what topics are covered in the various units.

The first unit of Part I, A, is an introductory unit that has no specific knowledge objectives and consequently, no Review Exercises. This unit serves to acquaint trainees with the class schedule and the general course structure.

Units B through G and the Part II units are identical in format. Due to their length, most of the units are broken down into several "modules." These modules will provide you with a logical place to schedule breaks, lunch hours, etc. Each of these units consists of the following sections, arranged in the following order:

Description of Unit Page(s)

The first page(s) of every unit is a description of the unit content. A brief overview of the material covered is provided, as well as time estimates for each of the modules and the Review Exercises.

Trainees' Knowledge Objectives

This second section of each unit is a specific statement of the trainees' learning objectives for the unit. Pay particular attention when reading over these objectives; they provide you with guidance on which points to emphasize in your class presentation. Most of these objectives will be measured in the Review Exercises.

Instructor Preparation Activities

The third section, Instructor Preparation Activities, contains a listing of all activities you must accomplish prior to teaching a unit. For example, in Unit I-B it will be necessary for you to prepare a listing of your state statutes as they relate to emergency vehicle operation. The forms to list the statutes on have been provided with the instructor preparation pages. This section also contains a list of the equipment and materials needed for teaching the unit. When transparencies are required, they are identified by number.

The last item of information appearing on the preparation pages, Additional Resource Documents, is a listing of relevant document numbers, should you need to obtain additional information for a given unit. The document numbers refer to the documents listed in the Bibliography and References listing at the very back of your ILP.

Unit Content Pages

You will notice that most of the unit content pages have a two-column format. The left-hand column, INSTRUCTIONAL CONTENT/PRESENTATION GUIDELINES, contains three different kinds of information:

1. Text materials. This information is presented in outline form. This portion of the unit content is essentially the same as that in the TSG, except that in many cases the wording has been reduced to a "key-word sentence" form.

2. Instructor-based text materials. If you look at one of the unit content pages you will see that several points have a bullet (•) in front of them. These bullets cue you that this information does not appear in the TSG. It is important to present all of this material; in many cases

the trainees will have printed questions in their guides that relate to this material.

3. Presentation guidelines. Some of the sentences in the left column are printed in *italics*. These are hints to help you with your presentation. In many cases they will lead you to ask or tell the trainees something. They suggest ways to keep the trainees actively involved. These guidelines are for your use, and should not be presented directly to the trainees.

The right column of the unit content pages is titled NOTES. This column has three purposes:

1. It shows you which page in the TSG the trainees should be looking at (e.g., TSG - I-B-4).
2. It cues you as to when instructional aids are appropriate (e.g., chalkboard, transparencies*).
3. It allows space for you to enter your own notes, either before or during your classroom presentation.

Review Exercises

A series of review questions is presented at the end of each unit except Unit A. These questions are based on the materials presented in that unit. After you have presented all of the materials in a given unit, you should allow time for the trainees to complete the Review Exercises. The trainees should be able to complete these questions without going back to their text. You may use these Review Exercises for grading purposes if you choose to do so. Whether or not you grade the exercises, it is a good idea to go over the correct answers with the class. The answers appear, with the Review Exercises, at the end of each unit in the ILP.

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*Masters for all transparencies are provided in Appendix 2 at the end of the Instructor Lesson Plans.

Description of Unit

This unit serves to familiarize trainees with the general content and structure of the entire course.

Module 1 - 50-60 Minutes

1. INTRODUCTION. General Procedures. Description of agenda and location of facilities.

2. Trainee Prerequisites. Explanation of trainee prerequisites.

3. THE TRAINEE STUDY GUIDE. Format. Explanation of structure and instructions for using the TSG.

4. ORGANIZATION OF THE COURSE. Part I, Part II, Part III. Description of basic content and structure for each part.

5. DEFINITIONS. Brief explanation of the terms used throughout the course.

6. SCHEDULE. Presentation of schedule for the entire course.

Instructor Preparation Activities

Module 1

1. Read over the entire module and be prepared to present a lecture on those materials.
2. Preparation for I-A-3. Find out the location of eating, telephone, message board, parking, and toilet facilities in the location where the training will be conducted, and be prepared to present it to the class.
3. Preparation for I-A-8. Look over the Schedule carefully. If you find you will need to make changes to it, note them in your ILP so that you can present them to the trainees in class.

Equipment: Chalkboard and chalk.

Materials: None.

UNIT TITLE	INTRODUCTION	**UNIT PAGE**	I-A-3

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES	**NOTES**
INTRODUCTION	* * * BEGIN MODULE 1 * * *
-Welcome the trainees and pass out the Trainee Study Guides.	TSG - I-A-1
-Tell the trainees your name.	CHALKBOARD

-Ask the trainees to introduce themselves.

-Explain the purpose of the course to the trainees:

- To enable members of the various emergency services to become more competent in the operation of emergency vehicles.

General Procedures

The following general procedures will be followed on each training day:

A. Attendance.

B. Announcements.

-Tell the trainees the arrangements for the following:

- Break times.
- Eating facilities.
- Toilet facilities.
- Telephones
- Message Board
- Student Parking

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES	NOTES
Trainee Prerequisites A. Trainees must be licensed drivers. B. Trainees are assumed to be qualified to operate the general class of vehicle (e.g., sedan, van, truck) they will be operating for their emergency service. C. Trainees must have completed the National Safety Council Defensive Training Course.	TSG - I-A-1

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES

THE TRAINEE STUDY GUIDE

A. The Trainee Study Guide (TSG) should always be brought to class.

B. Each unit is preceded by Knowledge Objectives. These tell the trainee what he is expected to know by the end of the unit.

Format

A. Left Column: The left column contains the text and illustrations.

B. Right Column: The right column has two purposes:

  1. It provides space to answer the questions printed there. Whenever a plus sign (+) appears, it means that note-taking is required.

  2. It provides space to take additional notes on the basis of the instructor presentation.

C. Review Exercises: The Review Exercises at the end of each unit are meant to determine how much the trainees know (or have learned) about the topics in that unit.

-*Explain to the trainees what these exercises will be used for. If they will be graded, you should tell them so now.*

NOTES

TSG - I-A-2

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES	NOTES
ORGANIZATION OF THE COURSE	TSG - I-A-3

ORGANIZATION OF THE COURSE

Part I - Basic

– Use the Table of Contents to provide a brief overview of the unit coverage for Part I.

The units in Part I are general in nature; they are relevant to trainees from all of the emergency services: police, fire, ambulance, and rescue. They apply no matter what type of vehicle will be operated on the job.

Part II - Specialized

– This course is designed to be presented by any emergency service. During Part II, the instructor should focus on only those materials appropriate to trainee needs for his or her emergency service.

The Part II unit covers specific service- and mission-related knowledge.

Part III - In-Vehicle (Practical)

– Explain that for this part of the course, the trainees will be assigned to the type of vehicle they will operate upon course completion.

This third part of the course is devoted to practical, in-vehicle exercises for developing trainees' skill in operating an EV.

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES	NOTES

DEFINITIONS

TSG - I-A-4

- Make sure these definitions are clear to the trainees.

Whenever one of these terms appears in the training, it should be understood to mean the following:

A. Emergency Mode: When an authorized emergency vehicle, operating with emergency warning devices (lights and sirens) activated, is on a mission involving a (possible) life-threatening situation.

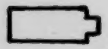
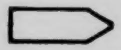
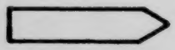
B. Emergency Vehicle (EV): Any vehicle which is legally authorized to operate in the emergency mode. The vehicle is an emergency vehicle whether or not it is operating in the emergency mode.

C. Emergency Vehicle Operator: A person who is authorized to drive an emergency vehicle in the emergency mode.

D. Emergency Service: Police and volunteer or salaried fire, rescue and ambulance personnel.

E. Illustrations: In the text, illustrations of

CHALKBOARD

1. An EV look like this: 
2. An ordinary car look like this: 
3. A large vehicle or truck look like this: 

SCHEDULE

-If you will be making any changes to this schedule, have the trainees note these changes now.

Example Schedule for Emergency Vehicle Operation Training

	8am	9	10	11	12pm	1	2	3	4
Day 1	Unit A	Unit B		Unit C	L	Unit C Unit D			Unit E
Day 2	Unit E Unit F (Modules 1-5)				U	Unit F (Modules 6-9)			
Day 3	Unit G		Part II Specialized		N	Part II Specialized		Part III Classroom	
Day 4	Part III Range				C	Part III Range			
Day 5	Part III Range				H	Part III Range			

NOTE: Times shown for each unit are estimates and include time for the Review Exercises. These time estimates need not be adhered to rigidly. The overall scheduling objective is to complete all classroom work, including the Part III classroom work, by the end of the third day.

Description of Unit

This unit deals with the legal aspects of emergency vehicle operation.

Module 1 - 40-50 Minutes

1. INTRODUCTION. An overview of the kinds of regulations governing emergency vehicle operation and the three basic principles of emergency vehicle operation.
2. STATE STATUTES ON EMERGENCY VEHICLE OPERATION. Presentation of the specific state statutes as well as local ordinances and departmental policy.
3. INTERPRETING THE LAW. What Is a True Emergency? Development of the concept of "true emergency" including a case history.

Module 2 - 30-40 Minutes

1. What Is Due Regard For The Safety of Others? Development of the concept of "due regard" including a case history.
2. SUMMARY. Brief review of the unit materials including Practice.

Review Exercises - 20 Minutes

Written review questions on material presented in the two modules of this unit. Time estimate allows for discussion and explanation after trainees have completed exercises.

Trainees' Knowledge Objectives

Module 1

By the end of this module, the trainees:

1. Given a list of topical areas covered by state statutes, will be able to write a brief description of the statute as it relates to emergency vehicle operation.
2. Given descriptions of several situations, will be able to identify those situations that represent a true emergency and explain why.

Module 2

By the end of this module, the trainees:

1. Given descriptions of several situations, will be able to identify those situations that illustrate due regard for the safety of others and those that do not.

Instructor Preparation Activities

Module 1

1. Preparation for I-B-10. Prepare a listing of state statutes using the forms that follow these Instructor Preparation pages. Highlight important sections on emergency vehicle operation. In order to fill out the forms, you will have to obtain a copy of your state's Motor Vehicle Code. Look at the example provided with the forms to see what kinds of information are required. If your state statutes address any other topics that are not listed, use the blank space provided on the forms. Put the name of the state from which the statutes were taken in the blank at the top of the form. When you have completed the listing, make enough copies for all trainees.

2. Preparation for I-B-10. Obtain copies of any local ordinances and departmental policies that relate to the topics listed on the forms. This information should not be written on the forms given to the trainees. Instead, it should be presented during the discussion of the statutes, with trainees encouraged to take notes.

3. Preparation for I-B-11. Think up several examples of a "true emergency" and be prepared to present them during the class discussion of "true emergency." Newspaper clippings can be highlighted and discussed in detail.

4. Read over the entire module and be prepared to present a lecture on these materials.

Equipment: Chalkboard and chalk.

Materials: Enough copies of state statutes, regulations, local ordinances, and policies for all trainees.

Module 2

1. Preparation for I-B-17. Create three situations using the example below, and note them on page I-B-17. Make the situations relevant to the trainees' experience level and emergency service.

Instructor Preparation Activities (Continued)

Each situation should illustrate two points: a true emergency situation (or lack of it), and due regard for the safety of others (or lack of it).

EXAMPLE: A police officer traveling 50 mph on an icy road to reach the scene of an automobile accident (with injuries). There is a police vehicle and an ambulance already at the scene. The police dispatcher fails to alert all units that assistance has arrived on scene.

2. Read over the entire module and be prepared to conduct a lecture on these materials.

Equipment: Chalkboard and chalk.

Materials: None

Review Exercises

Questions 1.a, 1.b, 1.c. The answers for these questions do not appear in your copy of the Review Exercises, because they are dependent on your state's statutes. Find the correct answers on the State Statutes Chart which you prepared for Module 1, and note them on your copy of the Review Exercises so that you can present them to the class when they have completed the Review Exercises.

Additional Resource Documents:

Bibliography and reference nos.: 7, 36, 37.

RELEVANT STATE STATUTES*
Uniform Vehicle Code

Definition of Emergency Vehicle	Notes	Local Policy/Ordinances
Ch. 1, Sec. 1-104 Such fire department vehicles, police vehicles and ambulances as are publicly owned, and such other publicly or privately owned vehicles as are designated by the commissioner (or other appropriate state official). . .		
Proceeding past red lights and stop signals Ch. 11, Sec. 11-106, (b) 2. The driver of an authorized emergency vehicle may proceed past a red or stop signal or stop sign, but only after slowing down as may be necessary for safe operation.		
Recognized warning devices Ch. 12, Sec. 12-218, (a). Every authorized emergency vehicle shall, in addition to any other equipment and distinctive markings required by this act, be equipped with a siren exhaust whistle or bell capable of giving an audible signal.		

EXAMPLE

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*36

RELEVANT STATE STATUTES
Motor Vehicle Code, State of ___________

Definition of Emergency Vehicle	Notes	Local Policy/Ordinances
Proceeding past red lights and stop signals		
Recognized warning devices		

RELEVANT STATE STATUTES
Motor Vehicle Code, State of ___________
(Continued)

Violating traffic flow and turn regulations

Passing

Parking at the scene of an emergency

RELEVANT STATE STATUTES
Motor Vehicle Code, State of __________
(Continued)

Exceeding posted speed limits

Definition of an emergency

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES

INTRODUCTION

A. Three types of regulations to follow: (1) motor vehicle and traffic laws enacted by the state government, (2) local ordinances (e.g., local speed limits), and (3) departmental policy about what you as an EV operator may and may not do.

B. Three principles of EV operation.

-*Emphasize these three points:*

1. EV operators subject to all traffic regulations unless a specific exemption is made.
    - A specific exemption is a statement which appears in the statutes such as: "The driver of an authorized emergency vehicle may exceed the maximum speed limits so long as he does not endanger life or property."
2. Exemptions are legal only in the emergency mode.
3. Even with an exemption, operator can be found criminally or civilly liable if involved in an accident.

NOTES

* * * BEGIN MODULE 1 * * *

TSG - I-B-2

UNIT TITLE	SOME LEGAL ASPECTS OF EMERGENCY VEHICLE OPERATION	**UNIT PAGE**	I-B-10

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES	**NOTES**
STATE STATUTES ON EMERGENCY VEHICLE OPERATION -*Provide trainees with copies of the listing of state statutes you have prepared. Help the trainees translate the legal jargon into plain language. (Suggest notetaking). Provide clarification or further explanation if needed.* -*Provide any local ordinances or departmental policy relevant to the statutes.*	TSG - I-B-3

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES

NOTES

INTERPRETING THE LAW

TSG - I-B-4

Actions will be judged by others (e.g., superiors, in court), from at least two aspects:

A. True emergency?

B. Due regard?

What is a True Emergency?

Exemptions legal only in true emergency situation. Definition of true emergency unclear.

A. Sometimes operator does not have to decide for himself.

- The code system used will make the severity of the emergency clear.
- Information provided by and solicited from the dispatcher will make the nature of the emergency clear.
- The emergency service the operator is affiliated with will make the nature of the emergency clear.

B. When operator must decide, the following definition should be considered:

A situation in which there is a high probability of death or serious injury to an individual, or significant property loss, and action by an EV operator may reduce the seriousness of the situation.

-Cite examples that illustrate this definition.

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES

Case History

-Allow the trainees a few minutes to read over the case history (Figure I-1) on the following page. Raise the following questions:

- Might the results of this case been different if the officer had slowed to 20 mph?
- Might the results have been different if the officer had had both hands on the steering wheel?
- Might the results have been different if the little girl had had a more serious injury initially (e.g., uncontrolled bleeding)?

-When discussion is complete, summarize the case as follows:

- Every one of the factors might have caused the court to reach a different decision. The most critical factor, however, was probably the fact that the child was not seriously injured--her condition did not represent a "true emergency." The officer was negligent in exercising the exemptions granted by the law.

NOTES

TSG - I-B-5

TSG - I-B-6

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES

NOTES

In the case of Wood v. Morris* a police officer was transporting a young girl with an injured arm to the hospital when he collided with another vehicle. The collision caused additional injury to the child. Although the police vehicle's siren and red light were in operation at the time of the collision, the court found him negligent, and an appellate court affirmed that finding as follows:

> "The evidence showed that the defendant approached the intersection, which he knew to be one of the main traffic arteries of the city, at a speed of 45-50 mph; that he knew the speed limit at that place was 25 mph; that the street was wet with rain and was of asphalt construction, which he knew makes it even more slick; that he did not apply the brakes as he approached the intersection and only slowed the vehicle perhaps 5 mph before entering the intersection; that he was operating the vehicle with his left hand, while holding the siren with his right hand, being right-handed; that the plaintiff's injuries were not of a critically serious nature, being confined primarily to her arm, so that she was able to get into the automobile and talk. The above evidence was sufficient to authorize a finding of ordinary negligence on the part of the defendant policeman. . ."

Figure I-1. Passenger in police vehicle wins negligence case.**

TSG - I-B-6

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*109 Ga. App. 148, 135 S.E. 2nd 484, 487 (1964).
**7

* * END OF MODULE 1 * *

* * * BEGIN MODULE 2 * * *

TSG - I-B-7

What is Due Regard for the Safety of Others?

Must be based on circumstances. Guidelines:

A. "Enough" notice of approach, before collision is inevitable.

- "Enough" is difficult to define. If motorists have windows up, heater or air conditioner and radio on, it may take them a long time to respond.
- Notice is given by using appropriate signaling equipment (i.e., lights and siren) in accordance with statutes.

B. In judging due regard in use of signaling equipment, courts will consider:

1. Was it necessary to use it?
2. Was it used?
3. Was signal audible and/or visible to motorists and pedestrians?

C. Use of signaling equipment must be accompanied by caution.

D. An accepted definition of due regard is:

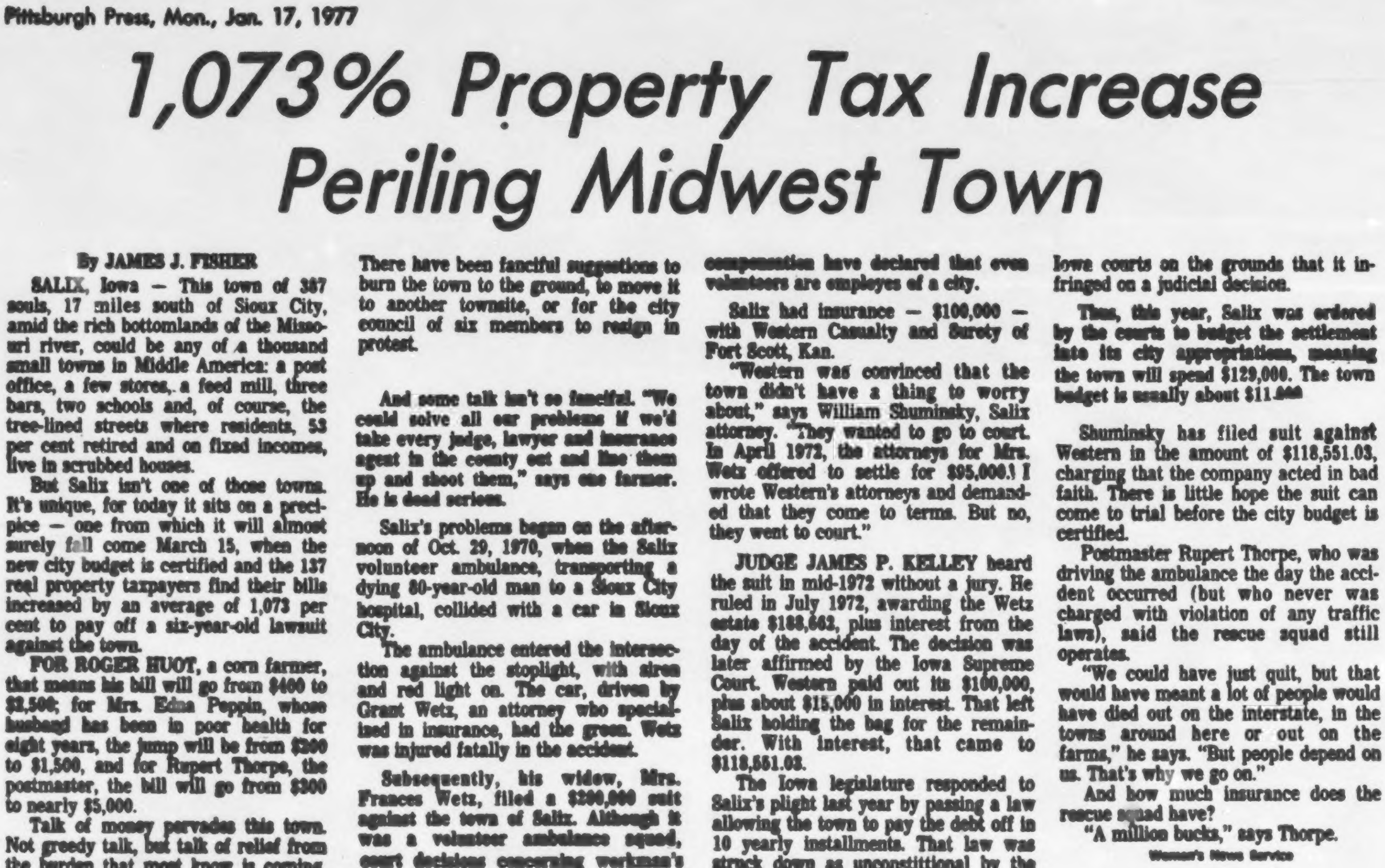
A reasonably careful man, performing similar duties and under similar circumstances, would act in the same manner.

TSG - I-B-8

A Second Case History

TSG - I-B-9

-Allow the trainees a few minutes to read over Figure I-2 on the following page. Raise the following questions (page I-B-16):



Pittsburgh Press, Mon., Jan. 17, 1977

1,073% Property Tax Increase Periling Midwest Town

By JAMES J. FISHER

SALIX, Iowa — This town of 387 souls, 17 miles south of Sioux City, amid the rich bottomlands of the Missouri river, could be any of a thousand small towns in Middle America: a post office, a few stores, a feed mill, three bars, two schools and, of course, the tree-lined streets where residents, 53 per cent retired and on fixed incomes, live in scrubbed houses.

But Salix isn't one of those towns. It's unique, for today it sits on a precipice — one from which it will almost surely fall come March 15, when the new city budget is certified and the 137 real property taxpayers find their bills increased by an average of 1,073 per cent to pay off a six-year-old lawsuit against the town.

FOR ROGER HUOT, a corn farmer, that means his bill will go from $400 to $2,500; for Mrs. Edna Peppin, whose husband has been in poor health for eight years, the jump will be from $200 to $1,500, and for Rupert Thorpe, the postmaster, the bill will go from $300 to nearly $5,000.

Talk of money pervades this town. Not greedy talk, but talk of relief from the burden that most know is coming. There have been fanciful suggestions to burn the town to the ground, to move it to another townsite, or for the city council of six members to resign in protest.

And some talk isn't so fanciful. "We could solve all our problems if we'd take every judge, lawyer and insurance agent in the county out and line them up and shoot them," says one farmer. He is dead serious.

Salix's problems began on the afternoon of Oct. 29, 1970, when the Salix volunteer ambulance, transporting a dying 80-year-old man to a Sioux City hospital, collided with a car in Sioux City.

The ambulance entered the intersection against the stoplight, with siren and red light on. The car, driven by Grant Wetz, an attorney who specialized in insurance, had the green. Wetz was injured fatally in the accident.

Subsequently, his widow, Mrs. Frances Wetz, filed a $200,000 suit against the town of Salix. Although it was a volunteer ambulance squad, court decisions concerning workman's compensation have declared that even volunteers are employes of a city.

Salix had insurance — $100,000 — with Western Casualty and Surety of Fort Scott, Kan.

"Western was convinced that the town didn't have a thing to worry about," says William Shuminsky, Salix attorney. "They wanted to go to court. In April 1972, the attorneys for Mrs. Wetz offered to settle for $95,000. I wrote Western's attorneys and demanded that they come to terms. But no, they went to court."

JUDGE JAMES P. KELLEY heard the suit in mid-1972 without a jury. He ruled in July 1972, awarding the Wetz estate $188,662, plus interest from the day of the accident. The decision was later affirmed by the Iowa Supreme Court. Western paid out its $100,000, plus about $15,000 in interest. That left Salix holding the bag for the remainder. With interest, that came to $118,551.03.

The Iowa legislature responded to Salix's plight last year by passing a law allowing the town to pay the debt off in 10 yearly installments. That law was struck down as unconstitttional by the Iowa courts on the grounds that it infringed on a judicial decision.

Thus, this year, Salix was ordered by the courts to budget the settlement into its city appropriations, meaning the town will spend $129,000. The town budget is usually about $11,000.

Shuminsky has filed suit against Western in the amount of $118,551.03, charging that the company acted in bad faith. There is little hope the suit can come to trial before the city budget is certified.

Postmaster Rupert Thorpe, who was driving the ambulance the day the accident occurred (but who never was charged with violation of any traffic laws), said the rescue squad still operates.

"We could have just quit, but that would have meant a lot of people would have died out on the interstate, in the towns around here or out on the farms," he says. "But people depend on us. That's why we go on."

And how much insurance does the rescue squad have?

"A million bucks," says Thorpe.

Women's News Service

Figure I-2. Property Tax Increase Periling Midwest Town.

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES	NOTES
•Did this situation appear to be a true emergency? •Did the operator exercise due regard for the safety of others? •Why do you think the court reached the decision it reached? *-Summarize the case:* •The situation does appear to be a true emergency. The court probably came to its decision on the basis of lack of due regard for the safety of others.	TSG - I-B-9

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES	NOTES
SUMMARY	TSG - I-B-10
Guidelines to minimize negligence:	
A. True emergency must exist before exercising exemptions.	CHALKBOARD
1. High probability of death or serious injury.	
2. Property is imperiled.	
3. Action on operator's part could reduce severity.	CHALKBOARD
B. Under any and all circumstances, exercise due regard.	
Practice	TSG - I-B-11
-Describe the first situation you developed in your preparation. Call upon a trainee and let him tell whether or not he feels the situation was a true emergency and whether or not due regard was exercised.	
-Repeat for the two remaining situations.	
Situation 1:	
Situation 2:	
Situation 3:	
	* * END OF MODULE 2 * *

Review Exercises

1. For each of the topical areas listed below, write a brief description of the relevant points of your state statute.

   a. Proceeding past red lights and stop signals:

   b. Violating traffic flow and turn regulations:

   c. Parking at the scene of an emergency:

2. From the information available, which of the following situations should be treated as a true emergency by an EV operator? Explain why.

   a. Three-car collision, injuries (severity unknown). No other EVs at the scene.

   True emergency (yes or no)? *Yes*

   Why? *Primarily because there are injuries. Because so little information is given about the injuries or about any other circumstances (e.g., road blocked?) the operator must assume a true emergency.*

b. The dispatcher reports that a dog, possibly rabid, is threatening children in a nearby neighborhood.

True emergency (yes or no)? *Yes*

Why? *A rabid dog would represent a real threat to human life. Since there is no way to determine, for certain, whether or not the dog is rabid without the aid of a veterinarian, someone should arrive at the scene quickly to restrain the animal.*

c. The dispatcher reports that a man phoned, requesting aid. He thinks his son may have broken his ankle; there is some pain and swelling.

True emergency (yes or no)? *No*

Why? *Unless local policy dictates otherwise, a broken bone is generally not considered a threat to human life.*

3. From the information available, which of the following situations seem to represent "due regard for the safety of others" and which do not? Why?

a. An EV operator, enroute to a true emergency, traveling 70 mph on an asphalt road in the rain (posted limit is 45 mph).

Due regard (yes or no)? *No*

Why? *Road and weather conditions are poor; the EV is traveling 25 miles OVER the posted limit, loss of control is not only possible, but likely.*

b. Proceeding through a red light, after slowing to 10 mph when returning to the station at the end of a run.

Due regard (yes or no)? *No*

Why? *There is no indication of a true emergency. Under that circumstance, proceeding through a red light not only represents a lack of due regard, but it is illegal.*

c. Traveling the wrong way down a one-way street, while enroute to a fire at a large apartment complex, using all signaling equipment.

Due regard (yes or no)? *Yes*

Why? *A true emergency does exist. The EV operator is complying with the statute (using signaling equipment) while violating normal direction of movement. Without more information to indicate why traveling the wrong way down this street might be unsafe, it would seem that the operator is exercising due regard.*

Description of Unit

This unit covers the factors to be considered when selecting (or preplanning) routes, as well as the techniques and procedures for reporting emergency vehicle operation.

Module 1 - 30 Minutes

1. SELECTING ROUTES.
2. Advantages of Preselection. Brief overview.
3. Factors to Consider. Presentation of factors to be considered in route planning, including: Location of Facilities, Events Affecting Traffic Flow, Characteristics of Local Roads and Streets, and Road Conditions.
4. Summary. Includes review of advantages and Practice.

Module 2 - 30 Minutes

1. REPORTING EMERGENCY VEHICLE OPERATIONS.
2. Introduction. Provides a general overview of techniques and procedures for both routine and mission-related communications.
3. Routine Communications. Provides specific techniques and procedures; includes Practice.
4. Mission-Related Communications. Provides specific techniques and procedures; includes Practice.

UNIT TITLE SELECTING ROUTES AND REPORTING EM

Description of Uni

Review Exercises - 15 Minutes

Written review questions on material presente allows for discussion and explanation after t it (Continued)

ed in the two modules of this unit. Time estimate
trainees have completed exercises.

Trainees' Knowledge Objectives

Module 1

By the end of this module, the trainees:

1. Will be able to state two advantages of careful route preselection.
2. Will be able to list three examples of the kinds of facilities whose location could be essential to route planning.

Module 2

By the end of this module, the trainees:

1. Given a list of several statements relating to communications techniques and procedures, will be able to identify which are correct.
2. Will be able to state the three items of information that must be obtained from the dispatcher before responding to an emergency call.

Instructor Preparation Activities

Module 1

1. Presentation for I-C-10. Obtain a local map. Select a section of the map (about 8" x 10") that most trainees should be familiar with. Prepare a list of factors that would have to be taken into consideration when planning a route. Look at the example map that follows these Instructor Preparation pages to help you in preparing your own. When you have completed the map and list of conditions, make enough paper copies for all trainees. In addition, make a transparency of the map for use with the overhead projector, to facilitate class discussion.

Equipment: Chalkboard and chalk; overhead projector.

Materials: Enough copies of prepared map for all trainees; transparency No. 1.

Module 2

1. Presentation for I-C-11. If communications codes are used in the area where the trainees will be working, obtain any materials you will need to teach them to the trainees.
2. Presentation for I-C-14. If priority codes are used in the area where the trainees will be working, obtain any materials you will need to teach them to the trainees.
3. Presentation for I-C-14. Prepare three descriptions of emergency situations for "transmission" to trainees. Use local codes, if appropriate. Only the dispatcher's initial transmission need be prepared. In the initial transmission, leave out some critical information to allow the trainees an opportunity to solicit it. Focus these transmissions on the three items of information that should be obtained for any emergency. You may write these on page I-C-15, in the space provided.

Instructor Preparation Activities (Continued)

Equipment: Chalkboard and chalk.

Materials: None.

Review Exercises

Question 3.a. No answer appears beside this question, because the answer is largely dependent on local policy. Find out the answer to the question so that you can give the trainees the correct answer after they have completed the Review Exercises.

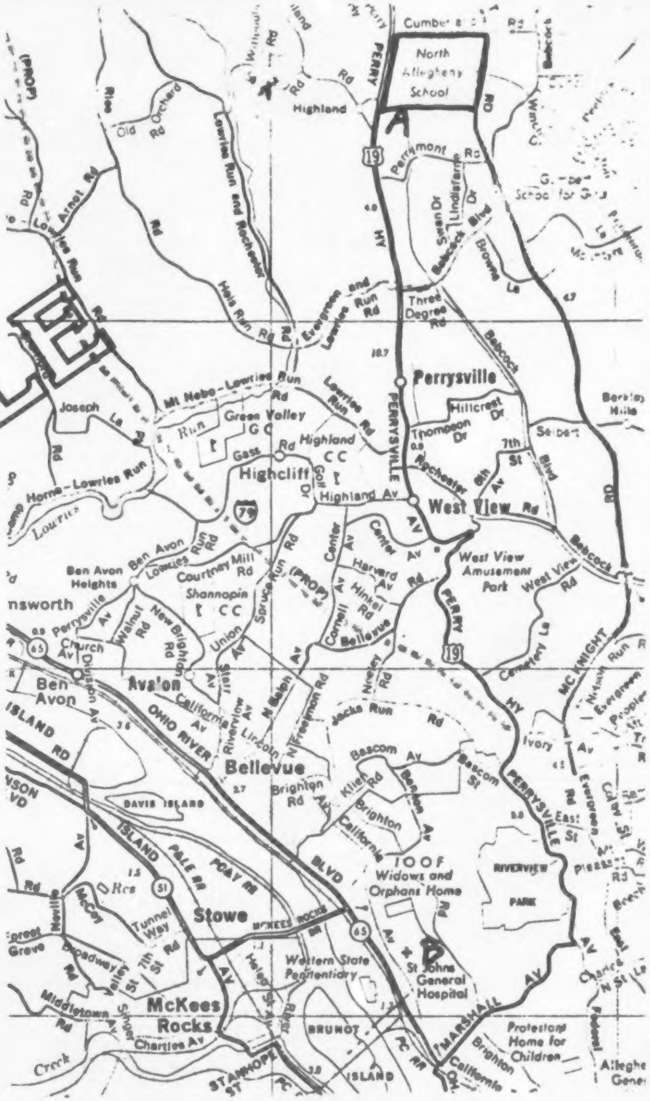
Additional Resource Documents:

Bibliography and reference no.: 5.

1. Conduct an emergency run from the North Allegheny School (A) to St. Johns General Hospital (B). The conditions are as follows:

   a. The entrance to the high school is on McKnight Road.
   b. The entrance to the hospital is on California Avenue.
   c. Perrysville Avenue (Rt. 19) is closed in the vicinity of Riverview Park.
   d. McKnight Road is a heavily-traveled road, with several shopping centers.
   e. It is 4:30 pm.

EXAMPLE


North Allegheny School
A
B
St Johns General Hospital
Perrysville
West View
Highcliff
Avalon
Ben Avon
Bellevue
Stowe
McKees Rocks
West View Amusement Park
Riverview Park
IOOF Widows and Orphans Home
Western State Penitentiary
Protestant Home for Children
Perrysville Av
Perry Hwy
McKnight Rd
Babcock Blvd
California Av
Ohio River Blvd
Marshall Av
Island Rd
Davis Island
19
79
65
51

EXAMPLE MAP AND LIST OF POSSIBLE CONDITIONS.

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES	NOTES
SELECTING ROUTES	* * * BEGIN MODULE 1 * * *
-Allow a couple of minutes for trainees to read over the Advantages.	TSG - I-C-2
Advantages of Preselection A. Travel time cut to minimum. B. Minimizes amount of "accident exposure." C. Driver can devote full attention to driving.	
Factors to be Considered Four factors:	
A. Location of Facilities (and their entrances and exits).	CHALKBOARD
-Have trainees assist in developing the list of facilities. Make sure that at least the following are included: •Schools •Factories •Shopping centers •Large apartment complexes •High-density work areas (industrial parks, downtown work areas) •Hospitals •Churches	

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES	**NOTES**
•Civic auditoriums, concert halls, stadiums, etc.	TSG - I-C-2
B. Events Affecting Traffic Flow.	CHALKBOARD
-Have trainees assist in developing the list of events. Make sure that at least the following are included:	
•Beginning and end of normal work day.	
•Shift-change times for large factories, hospitals, etc.	
•Beginning and end of normal school day.	
•Special events. This category is not as predictable as the others. An EV operator must make a special effort to keep informed of special events.	
-Ask the trainees to think of some ways to keep informed of special events. Make sure that at least the following are included:	CHALKBOARD
•Departmental bulletins.	
•Newspaper, other media.	
•School calendars.	
C. Characteristics of Local Roads and Streets.	TSG - I-C-3
1. Maps are essential to "new" EV operators or those who have been transferred to a new location.	
-Ask the trainees to think of the kinds of information likely to be found on detailed area maps. Make sure at least the following are included:	CHALKBOARD

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES	NOTES
•Road size (number of lanes).	TSG - I-C-3
•Divided roads.	
•Limited-access roads.	
•Large facilities (e.g., hospitals).	
2. Useful information not on maps can be added (penciled in).	
•Areas with a high incidence of accidents.	
•Very steep grades.	
•Roads or lanes on roads that change direction according to the traffic flow or time of day.	
D. Road Conditions. Operator must keep informed; can be noted on maps.	CHALKBOARD
•Damaged roads (potholes, badly rutted).	
•Detours or closed roads.	
•Roads or sections of roads that are difficult to travel in bad weather.	
•Accumulated water areas.	
•Speed breakers (dips or bumps).	

UNIT TITLE	SELECTING ROUTES AND REPORTING EMERGENCY VEHICLE OPERATIONS	UNIT PAGE	I-C-10

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES

Summary

Advantages:

A. Travel or transport time minimized.

B. "Accident exposure" minimized.

C. Driver can devote full attention to driving.

Practice

-Pass out copies of the map and list of conditions you prepared.

-Use the projector to show the transparency you prepared earlier.

-Select a trainee to describe a good route to the destination. Use the trainee's route selection as the basis for discussion. If there is disagreement about the chosen route, allow other trainees to present their viewpoints.

-Present these conclusions:

•In many cases there is no "single best route."

•The shortest route (in terms of miles) may not be the fastest route (in terms of time).

•Familiarity with the area is a tremendous advantage in selecting routes.

NOTES

TSG - I-C-4

PRESENT TRANSPARENCY 1
(Instructor prepared).

* * END OF MODULE 1 * *

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES	NOTES
	* * * BEGIN MODULE 2 * * *
REPORTING EMERGENCY VEHICLE OPERATIONS	
Introduction	TSG - I-C-5
Routine and mission-related communications.	
A. In-vehicle communications equipment to communicate with dispatcher.	
B. Standard codes (e.g., 10-codes) that speed up communications.	
-Ask the trainees to look at the example listing of communications codes (Figure I-3); the listing of 10-codes is meant as an example only.	TSG - I-C-6
-If it is necessary for you to teach the trainees any codes relevant to their service, this is the appropriate time to do so.	
C. General techniques for all communications:	TSG - I-C-5
•The goal of good communications techniques is to communicate all necessary information with minimal disruption of the driving tasks.	
1. Brief and concise.	
2. Codes, if appropriate.	
3. Weigh urgency of communicating against difficulty of driving--don't compromise safety.	
4. Drop mike into lap to avoid tangling.	
5. Have partner conduct communications (if possible).	
6. Finish communications before starting run (if possible).	

10-1	Signal Weak	10-21	Call (________) by Phone
10-2	Signal Good	10-22	Disregard
10-3	Stop Transmitting	10-23	Arrived at Scene
10-4	Affirmative (OK)	10-24	Assignment Completed
10-5	Relay (To)	10-25	Report to (meet)
10-6	Busy	10-26	Estimated Arrival Time
10-7	Out of Service	10-27	License/Permit Information
10-8	In Service	10-28	Ownership Information
10-9	Say Again (Repeat)	10-29	Records Check
10-10	Negative	10-30	Danger/Caution
10-11	___On Duty	10-31	Pick-Up
10-12	Stand By (Stop)	10-32	___Units Needed (Specify)
10-13	Existing Conditions	10-33	Help Me Quick (Emergency)
10-14	Message/Information	10-34	Time
10-15	Message Delivered	10-35	-Reserved-
10-16	Reply to Message	10-36	-Reserved-
10-17	Enroute	10-37	-Reserved-
10-18	Urgent (Quickly)	10-38	-Reserved-
10-19	(In) Contact	10-39	-Reserved-
10-20	Location		

EXAMPLE

Figure I-3. Official List of Ten-Codes.*

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*5

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES	**NOTES**

Routine Communications

TSG - I-C-7

A. Operator must inform dispatcher before leaving the vehicle.

   1. It provides protection for the operator.
   2. Saves time--dispatcher will not waste time trying to contact.

B. Report arrival at destination. Provides opportunity to:

   1. Ask dispatcher to alert other organizations needed (e.g., hospital, highway maintenance).
   2. Receive information that might alter route or next destination.
   3. Tell the dispatcher you will be away from vehicle.

C. Report any major condition likely to cause disruption to emergency service, or ones other EVs probably don't know about.

Practice

TSG - I-C-8

-Describe the conditions listed below to the class.

-Ask one of the trainees to explain why (or why not) that condition should be reported to the dispatcher.

- •Broken traffic light at major intersection.
- •Disabled vehicle blocking traffic.
- •A new detour.
- •Section of missing guard rail on freeway.

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES	NOTES
Mission-Related Communications	TSG - I-C-8

Mission-Related Communications

A. The three items that must be obtained for every call:

1. Description of emergency.
2. Address (location) and other identifiers.
3. Indication of priority.

-*If priority codes are used locally, this is the appropriate place to present them to the class. If trainees will be using priority codes and communications codes, make sure they have a clear understanding of the difference between the types of codes.*

B. Other information that might be obtained (depending on type of call):

1. Roadway blocked?
2. Other EVs on the way or on scene?
3. Hazardous materials (e.g., gasoline spillage)?

- Items 2 and 3 can have bearing on route planning and parking for any emergency.
- For example, if gasoline spillage were involved, it might be wise to approach from the direction that represented the least risk of danger.

Practice

-*Select a trainee and "transmit" one of the messages you prepared earlier. Allow the trainee to solicit additional information.*

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES	NOTES
- *Be sure to point out any of the three items of information the trainee forgot to obtain, and the reason why that information is important.*	TSG - I-C-8
- *Repeat for all of the "transmissions" you prepared.*	
Message 1:	
Message 2:	
Message 3:	
	* * END OF MODULE 2 * *

Review Exercises

1. List two advantages of careful route planning.

Travel time can be cut to a minimum.

Careful route planning minimizes the amount of "accident exposure."

The driver can devote his full attention to the driving tasks.

2. List three examples of the kinds of facilities whose location could be essential to route planning.

Schools

Factories

Shopping centers

High-density work areas

Hospitals

Churches

Civic auditoriums, concert halls

3. Indicate which of the following statements are true and which are false:

	T	F
a. All communications with the dispatcher should be conducted using 10-codes.	*Local*	*Policy*
b. Communications should be completed before starting a run, if possible.	*x*	
c. The EV operator should always inform the dispatcher if he will be leaving the vehicle.	*x*	

	T	F
d. If a second crew member is present, he should conduct communications.	*x*	
e. The microphone should always be placed on its clamp by the receiver as soon as communications are ended.		*x*

4. List the three items of information that must be obtained from the dispatcher before responding to any emergency call.

Description of emergency.

Address (location).

Indication of priority.

Description of Unit

This unit provides the trainees with the knowledge necessary to prepare their EV before they drive. It describes, briefly, how a motor vehicle works. It also includes inspection procedures, a list of symptoms of malfunction, and a description of pre-start procedures for the operator. It concludes with a module providing practical experience in inspecting EVs and applying pre-start procedures.

Module 1 - 50-60 Minutes

1. VEHICLE INSPECTION--THE OPERATOR'S RESPONSIBILITY, Introduction. A brief overview of the operator's responsibility re: inspection and maintenance.

2. Major Components of a Vehicle. Brief explanation of the workings of a motor vehicle. Material can be expanded if instructor desires, to more specifically meet the needs of the target audience.

3. The Physical and Visual Inspection. Explanation of how and when vehicle should be inspected; using a checklist (included in unit).

4. MAINTENANCE OF THE EMERGENCY VEHICLE. Provides general guidelines for having maintenance/repair performed; provides opportunity for instructor to accommodate specific departmental structure.

5. Key Indicator Chart. Provides specific symptoms or "key indicators" of malfunctions. Also provides an opportunity for instructor to indicate exactly what trainees' responsibility for performing maintenance is.

Module 2 - 30 Minutes

1. PREPARING TO DRIVE. Includes General Procedures to Increase Driving Ease and Safety, Making Safety Checks and Adjustments, Start-up Procedures, and Precautions Before Moving.

Description of Unit (Continued)

Module 3 - 60 Minutes (variable, according to class size)

1. PRACTICE IN INSPECTION, MAINTENANCE, AND PRE-START PROCEDURES. Instructor demonstration and trainee performance of inspection, maintenance, and pre-start procedures.

Review Exercises - 20 Minutes

Written review questions on material presented in Modules 1 and 2. Time estimate allows for discussion and explanation after trainees have completed exercises.

Trainees' Knowledge Objectives

Module 1

By the end of this module, the trainees:

1. Given a list of several statements relating to vehicle inspection and maintenance, will be able to identify those statements that are correct.
2. Given a list of vehicle components, will be able to list two indicators (symptoms) of problem/malfunction for each.

Module 2

By the end of this module, the trainees:

1. Will know the criteria for proper adjustment of:
   a. Seat position.
   b. Head restraint.
   c. Lap belt.
   d. Shoulder harness.
   e. All mirrors.

   Trainees will demonstrate application of this knowledge in Module 3.

Trainees' Knowledge Obejctives (Continued)

Module 3

By the end of this module, the trainees:

1. Given a copy of the Inspection Checklist, will be able to perform a thorough inspection of a motor vehicle, and correctly identify any symptoms of malfunctions or items requiring repair.
2. Will be able to perform any minor maintenance required.
3. Will be able to demonstrate proper adjustment of:
   - a. Seat position.
   - b. Head restraint.
   - c. Lap belt.
   - d. Shoulder harness.
   - e. All mirrors.

Instructor Preparation Activities

Module 1

1. Read over the entire module and be prepared to present a lecture on those materials.

2. Preparation for I-D-10. Determine whether or not the amount of information provided in Major Components of a Vehicle is suitable for your specific group. If you determine that trainees need more explanation, (based on specific job requirements) prepare a lecture using some of the documents on the reference list at the end of this section. You should use the chalkboard to illustrate the material.

3. Preparation for I-D-18. Find out exactly what the trainees' responsibilities for performing maintenance are. Be prepared to tell them exactly what kinds of maintenance they will be expected to perform.

4. Preparation for I-D-18. Find out exactly how the trainees go about scheduling or reporting the need for maintenance in their specific locale. Be prepared to explain in class.

5. Preparation for I-D-19. Read over the material on the Key Indicator Chart. Look at the example (completed) copy of this chart which follows these Instructor Preparation Activities, pages I-D-8 and I-D-9. Fill out the blank chart which begins on page I-D-20 so that it accurately reflects local or departmental policy. Be prepared to present the information in class, so that the trainees can fill out the blank charts in their Study Guide.

Equipment: Chalkboard and chalk, overhead projector.

Materials: Enough copies for all trainees of any local or departmental policies re: inspection and maintenance. Transparency No. 2.

Instructor Preparation Activities (Continued)

Module 2

1. Read over the entire module and be prepared to discuss each of the procedures in class.
2. Preparation for I-D-26. Be prepared to discuss pre-start and starting procedures used for the particular type(s) of EVs represented in your class. You may need to modify the process on pages I-D-26 and I-D-27 to conform to the specific procedures.

Equipment: Chalkboard and chalk, overhead projector.

Materials: Copies of EV operators manuals if pre-start or starting procedures differ significantly from those in the text. Transparency No. 3.

Module 3

1. Preparation for I-D-28. Arrange to have several vehicles available for trainees' inspection. The exact number will be dependent upon class size, but a ratio of three trainees to one vehicle is suitable. It is not absolutely necessary that the trainees inspect the exact type of vehicle they will be operating on the job, but it is desirable.

   Before class begins, inspect all of the vehicles thoroughly, noting any symptoms of malfunction or need for repair that the trainees should identify in their inspection. This will allow you to grade the trainees' Inspection Checklists if you choose to do so.
2. If the trainees are required to perform any minor maintenance or repair work on the job, be prepared to demonstrate the correct procedures.
3. Preparation for I-D-29. Check over EVs to be used for demonstration of pre-start procedures, be sure:

Instructor Preparation Activities (Continued)

a. Seat position can be adjusted and that seat locks into position.

b. Mirrors are working properly and will hold adjustment.

c. Seat belts and shoulder harnesses are accessible, clean, and can be adjusted.

Equipment: Any tools or parts required to demonstrate maintenance or repair (if relevant). EVs (ideally, 1 EV per 3 trainees) in which pre-start procedures can be demonstrated and practiced.

Materials: Extra, blank copies of the Inspection Checklist. Copies of operator's manuals or valid manufacturer's descriptions of special starting procedures or other pre-start procedures relevant to the specific EV.

Additional Resource Documents:

Bibliography and reference nos.: 50, 60.

EXAMPLE

KEY INDICATOR CHART

ITEM	KEY INDICATOR	UNSAFE FOR EMERGENCY OPERATION	OPERATOR MAINTENANCE
APPROACH VEHICLE			
Attitude -Springs, torsion bars, tires	Vehicle lists, sags to one side, slants.	■	☐
Body	Dents or other damage.	☐	☐
	Oil on quarter panel.	☐	☐
CIRCLE VEHICLE			
Lights -Emergency lights	Light does not go on; dirty lenses; cracked lenses;	■	☐
-Head, parking, brake, back-up	lights noticeably dim.	■	☐
Tires -Tread	Tread-wear indicator visible, uneven tread wear.	■	☐
-Sidewalls	Breaks, cracks, bubbles.	■	☐
-Pressure	Does not meet vehicle manufacturer's specifications.	■	☐
Wheels	Cracked, bent rim, loose lug nuts.	■	☐
Doors	Do not close squarely or totally.	☐	☐
UNDER HOOD			
Fluid Levels -Radiator	Fluid not visible in radiator.	☐	☐
-Oil	More than one quart low.	■	☐
-Windshield washer	Less than half full.	☐	☐
-Hydraulic	Below add mark.	■	☐
-Battery	Water not visible in cells.	☐	☐
-Power Steering	Below add mark.	■	☐
-Automatic Transmission	Below add mark.	☐	☐
Engine Block	Check for evidence of oil or other fluid leak.	☐	☐
Hoses	Cracked, loose connections.	☐	☐
Belts	Cracked; loose: depresses more than one inch at center; tight: glazed surface.	☐	☐

Figure I-6. Key Indicator Chart

EXAMPLE

ITEM	KEY INDICATOR	UNSAFE FOR EMERGENCY OPERATION	OPERATOR MAINTENANCE
ENTER VEHICLE			
Cleanliness	Dirt or loose objects.	■	□
Seat Belt	Not bolted to floor; badly frayed; will not adjust properly or pull out fully.	■	□
Gauge and Display Indicators			
-Gas	Low (below 3/4).	□	□
-Oil Pressure	Low indication.	■	□
-Alternator/ammeter	Charging excessively; discharging; light on.	■	□
-Brake	Warning light on; skid control unit malfunction.	■	□
-Temperature	Warning light on; rises into danger zone.	■	□
-Air Pressure	Does not indicate proper pressure.	■	□
Turn Signals	Fast blinker; no blinker.	□	□
Windshield Wipers	Do not make contact with windshield; do not clear windshield properly.	□	□
Windshield Washers	Fluid does not come out; fluid does not come out with sufficient pressure; improperly aimed.	□	□
Communications Equipment	Cannot send or receive; channel drifts out.	■	□
Mirrors	Missing; will not hold adjustment.	■	□
Siren	Not audible.	■	□
Seat Adjustment	Will not lock into place.	■	□
PA System	Does not work; distorts.	□	□
Interior Lights	Do not light.	□	□
Cleanliness of Windows			
Engine	Will not start; stalls.	■	□
VEHICLE IN MOTION			
Steering	Wheel turns more than 1/8 turn without response; vehicle wanders; unusual noise; jerky on turn.	■	□
Brakes	Grab; pull to left or right; spongey; squealing.	■	□
Suspension	Unusual noise; too bouncy, not stable; noticeable vibration.	■	□
Acceleration	Rough, uneven, hesitates; cuts out.	■	□

Figure I-6. Key Indicator Chart (Continued)

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES

VEHICLE INSPECTION--THE OPERATOR'S RESPONSIBILITY

Introduction

A. Many accidents could be prevented by a five-minute physical and visual inspection.

B. Responsibility for the mechanical safety of the vehicle rests with the operator.

-Tell the trainees what their responsibilities are:

- Inspect vehicle every day (preferably at the beginning of shift).
- Ensure that maintenance/repair will be performed.
- Recheck the vehicle after maintenance.
- Determine if and when EV is unsafe (or potentially unsafe) for emergency operation.

Major Components of a Vehicle

Basic understanding of how vehicle components work will help operator perform the inspection.

-Your Vehicle Components Chart appears on the next page. Have the trainees refer to their Vehicle Components Chart. Explain each system of components to the trainees.

NOTES

* * * BEGIN MODULE 1 * * *

TSG - I-D-3

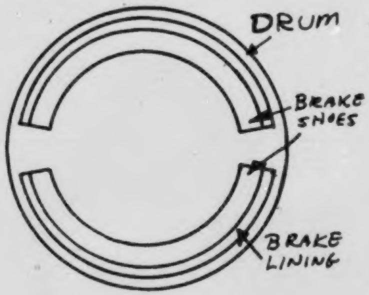
TSG - I-D-4, I-D-5, I-D-6

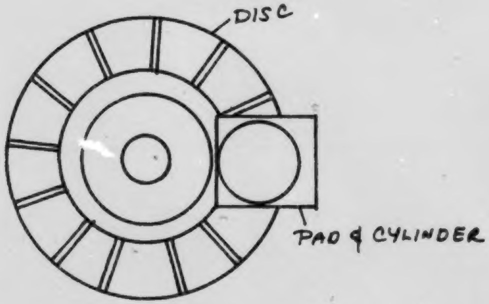
CHALKBOARD

Vehicle Components

Braking System

Drum Brakes	Pressure on brake pedal causes fluid or air to flow into brake cylinder. Cylinder moves brake shoe outward against brake drum (inner surface of metal wheel). This pressure of shoe against drum causes wheel to slow and stop.
Disc Brakes	A disc brake consists of a rotor and caliper assembly. The rotor is the disc. It is attached to the wheel axle. When the brake pedal is depressed, a hydraulic piston in the caliper causes the caliper to squeeze together, bringing a pair of brake shoes into contact with the rotor. The friction of the opposing brake pads as they squeeze the rotor slows the rotor rotation and causes the wheel to slow and stop.





Vehicle Components (Continued)

Engine (gasoline) Carburetor Combustion Chambers Pistons Crankshaft Camshaft	Takes fuel in gas tank, mixes it with air in carburetor. Mixture is fed into combustion chamber where it is ignited by spark plugs. The exploding mixture causes pistons to move. The motion of the pistons causes the crankshaft to turn. The rotating crankshaft connects the final power from the engine to the transmission. The power is then carried to the driveshaft, the differential, the rear axles, and the rear wheels.
Engine (diesel) Combustion Chambers Pistons Crankshaft	High compression of air charge in cylinder creates great heat. Fuel charge is injected into cylinder and is ignited by hot air. The exploding mixture causes pistons to move. The motion of the pistons causes crankshaft to turn.
Transmission and Driveshaft	A system of gears which allows you to change the ratio of number of engine revolutions to number of wheel revolutions. For example, in low gear, the engine might turn 100 times for one wheel turn. In a higher gear, the engine might turn ten times for one wheel turn. The driveshaft connects the transmission to the rear wheels, making them turn.
Clutch Pedal	When depressed, disconnects engine from transmission so you can change transmission gears.
Steering Assembly	Steering wheel and column connects to gears and linkage mechanism which changes direction of front wheels.
Electrical System Generator Alternator Battery	Supplies power for primary and auxiliary functions.

Vehicle Components (Continued)

Primary Functions:	Power generation and storage (battery, generator/alternator, and voltage regulator). Power distribution (engine wiring). Timing (distributor). Spark generation (spark plugs and coil).
Auxiliary Functions:	Inside/outside lighting (headlights, amber/red/blue signal or warning lights, turn signals, instrument panel lights, etc.). Air/heat circulation (heater, defroster, blowers). Horn, siren, PA system.
Suspension	Springs, shock absorbers, wheels, and tires which enable the driver to handle the vehicle properly on rough terrain and sharp curves, etc.

UNIT TITLE	BEFORE YOU DRIVE	**UNIT PAGE**	I-D-14

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES	**NOTES**
The Physical and Visual Inspection	TSG - I-D-7
A. Inspection uses a simple checklist; takes a few minutes. Operator should:	
1. Inspect vehicle when engine is cold.	
•For accurate readings (e.g., tire pressure) and to avoid burns.	
2. Inspect when interruptions are unlikely.	
-Ask the trainees to look at the Inspection Checklist, Figure I-4.	TSG - I-D-8
B. Checklist.	
-Explain the purpose of the five "events."	
•Approach Vehicle. This event is visual, conducted while the operator is walking towards the vehicle. Purpose: Check vehicle attitude, body damage.	
•Circle Vehicle. Purpose: Check all exterior vehicle equipment.	
•Under Hood. Purpose: Check fluid levels, belts, hoses, etc. Visual check for leaks or seepage.	PRESENT TRANSPARENCY 2
-For further clarification of the under hood part of the inspection, discuss Figure I-5 (Transparency 2).	TSG - I-D-9
•Enter Vehicle. Purpose: Check all interior equipment including control switches, gauges, indicator lights, mirror, safety equipment, etc.	

UNIT TITLE	BEFORE YOU DRIVE	**UNIT PAGE**	I-D-15

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES	NOTES
•Vehicle in Motion. Purpose: Check all equipment and functions that cannot be checked in a stationary vehicle (e.g., brakes, steering).	TSG - I-D-8

EMERGENCY VEHICLE INSPECTION CHECKLIST

Name:____________________ Date:__________ Time:________

Vehicle Identification No.:____________ Location:______________

		OK	FIX		OK	FIX
APPROACH VEHICLE	Vehicle Attitude	☐	☐	Body Damage	☐	☐
	Remarks:________________					
CIRCLE VEHICLE	Headlights	☐	☐	Beacon	☐	☐
	Running Lights	☐	☐	Flood	☐	☐
	Brake Lights	☐	☐	Body	☐	☐
	Four-Way Flasher	☐	☐	Wheels	☐	☐
	Tires	☐	☐	Windshield	☐	☐
	Doors	☐	☐			
	Remarks:________________					
UNDER HOOD	Hoses	☐	☐	Belts	☐	☐
Fluids:	*Radiator	☐	☐	Oil	☐	☐
	Windshield	☐	☐	Hydraulic	☐	☐
	Battery	☐	☐	Steering/Brake	☐	☐
	Remarks:________________					
ENTER VEHICLE	Cleanliness	☐	☐	Interior Lights	☐	☐
	Gas Gauge	☐	☐	Seat Belt	☐	☐
	Alternator	☐	☐	Brake Indicator	☐	☐
	Temperature	☐	☐	Air Pressure	☐	☐
	Windshield Wipers	☐	☐	Turn Signals	☐	☐
	Inner Mirrors	☐	☐	Communications	☐	☐
	Outer Mirrors	☐	☐	Siren/Audibles	☐	☐
	Oil Pressure	☐	☐	PA System	☐	☐
	Seat Adjustment	☐	☐			
	Remarks:________________					
VEHICLE IN MOTION	Steering/Smoothness	☐	☐	Brakes	☐	☐
	Unusual Noises	☐	☐	Suspension	☐	☐
	Remarks:________________					

---

*Radiator must be cool to avoid injury and to make accurate inspection.

Figure I-4. Inspection Checklist.

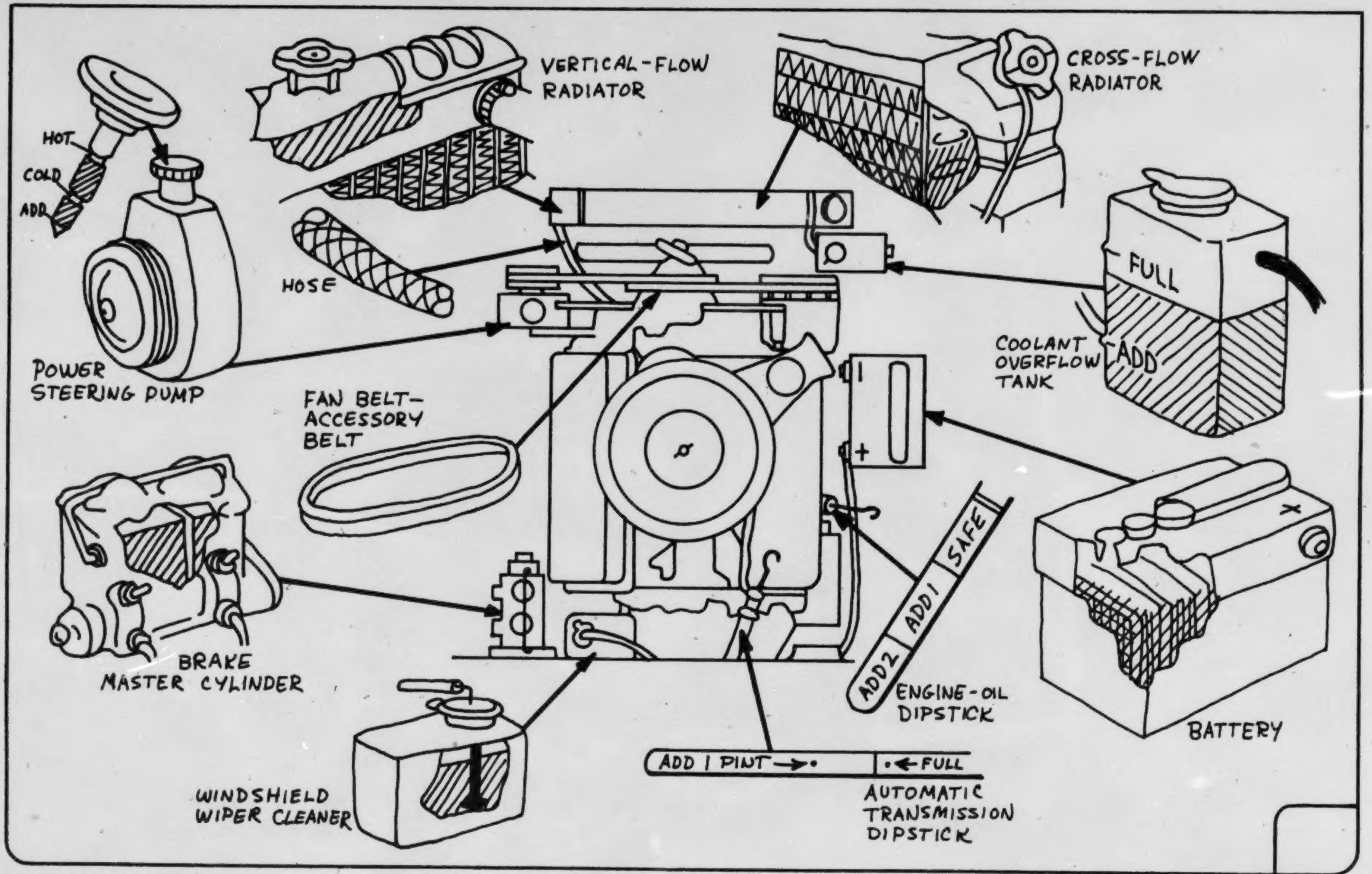

VERTICAL-FLOW RADIATOR
CROSS-FLOW RADIATOR
HOT
COLD
ADD
HOSE
FULL
ADD
COOLANT OVERFLOW TANK
POWER STEERING PUMP
FAN BELT-ACCESSORY BELT
SAFE
ADD1
ADD2
BRAKE MASTER CYLINDER
ENGINE-OIL DIPSTICK
BATTERY
ADD 1 PINT
FULL
WINDSHIELD WIPER CLEANER
AUTOMATIC TRANSMISSION DIPSTICK

Figure I-5. Engine Components.

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES	NOTES
MAINTENANCE OF THE EMERGENCY VEHICLE	TSG - I-D-10

MAINTENANCE OF THE EMERGENCY VEHICLE

A. Operator safety is dependent on vehicle condition. Well-maintained vehicles have fewer malfunctions, are easier to control. Part of the operator's job is to:

1. Perform any required maintenance.

-Operator responsibility in this area varies greatly, depending on locale, size of department, etc. As specifically as possible, tell the trainees what kinds of minor maintenance they are expected to perform themselves (if any).

2. Schedule maintenance, or notify those responsible for scheduling maintenance.

3. Recheck vehicle after maintenance/repair has been performed to verify correction.

-Explain the specific departmental structure for having maintenance performed in the trainees' locality. Copies of any departmental forms regarding maintenance and/or inspection can be presented at this time.

B. No matter who performs maintenance, it is the operator's responsibility to see that it is performed. Three ways to do this:

- Operator schedules maintenance, verifies upon completion.

- Operator reports problem to those responsible for scheduling maintenance, and verifies upon completion of maintenance.

- Operator performs maintenance himself.

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES

NOTES

Key Indicator Chart

TSG - I-D-10

-The Key Indicator Chart, Figure I-6, begins on the following page. Ask the trainees to turn to their copy of the chart and follow along as you explain what the column headings mean. Keep in mind that the trainees' chart does not have the last two columns filled in.

TSG - I-D-11

Column headings:

A. "Items." Items correspond directly with the listing on the Inspection Checklist.

B. "Key Indicators." Descriptions or indications of conditions that require corrective maintenance.

C. "Unsafe for Emergency Operation." Malfunction of items checked in this column could make a vehicle unsafe for emergency operation.

D. "Operator Maintenance." Items checked under this heading are those that, according to local or departmental policy, should be corrected by the operator himself.

-Go over each key indicator for the trainees. Tell the trainees that as you do so, you will tell them which items should be checked in the last two columns.

* * END OF MODULE 1 * *

KEY INDICATOR CHART

ITEM	KEY INDICATOR	UNSAFE FOR EMERGENCY OPERATION	OPERATOR MAINTENANCE
APPROACH VEHICLE			
Attitude			
-Springs, torsion bars, tires	Vehicle lists, sags to one side, slants.	☐	☐
Body	Dents or other damage.	☐	☐
	Oil on quarter panel.	☐	☐
CIRCLE VEHICLE			
Lights			
-Emergency lights	Light does not go on; dirty lenses; cracked lenses;	☐	☐
-Head, parking, brake, back-up	lights noticeably dim.	☐	☐
Tires			
-Tread	Tread-wear indicator visible, uneven tread wear.	☐	☐
-Sidewalls	Breaks, cracks, bubbles.	☐	☐
-Pressure	Does not meet vehicle manufacturer's specifications.	☐	☐
Wheels	Cracked, bent rim, loose lug nuts.	☐	☐
Doors	Do not close squarely or totally.	☐	☐
UNDER HOOD			
Fluid Levels			
-Radiator	Fluid not visible in radiator.	☐	☐
-Oil	More than one quart low.	☐	☐
-Windshield washer	Less than half full.	☐	☐
-Hydraulic	Below add mark.	☐	☐
-Battery	Water not visible in cells.	☐	☐
-Power Steering	Below add mark.	☐	☐
-Automatic Transmission	Below add mark.	☐	☐
Engine Block	Check for evidence of oil or other fluid leak.	☐	☐
Hoses	Cracked, loose connections.	☐	☐
Belts	Cracked; loose: depresses more than one inch at center; tight: glazed surface.	☐	☐

Figure I-6. Key Indicator Chart

ITEM	KEY INDICATOR	UNSAFE FOR EMERGENCY OPERATIC	OPERATOR MAINTENANCE
ENTER VEHICLE			
Cleanliness	Dirt or loose objects.	☐	☐
Seat Belt	Not bolted to floor; badly frayed; will not adjust properly or pull out fully.	☐	☐
Gauge and Display Indicators			
-Gas	Low (below 3/4).	☐	☐
-Oil Pressure	Low indication.	☐	☐
-Alternator/ammeter	Charging excessively; discharging; light on.	☐	☐
-Brake	Warning light on; skid control unit malfunction.	☐	☐
-Temperature	Warning light on; rises into danger zone.	☐	☐
-Air Pressure	Does not indicate proper pressure.	☐	☐
Turn Signals	Fast blinker; no blinker.	☐	☐
Windshield Wipers	Do not make contact with windshield; do not clear windshield properly.	☐	☐
Windshield Washers	Fluid does not come out; fluid does not come out with sufficient pressure; improperly aimed.	☐	☐
Communications Equipment	Cannot send or receive; channel drifts out.	☐	☐
Mirrors	Missing; will not hold adjustment.	☐	☐
Siren	Not audible.	☐	☐
Seat Adjustment	Will not lock into place.	☐	☐
PA System	Does not work; distorts.	☐	☐
Interior Lights	Do not light.	☐	☐
Cleanliness of Windows			
Engine	Will not start; stalls.	☐	☐
VEHICLE IN MOTION			
Steering	Wheel turns more than 1/8 turn without response; vehicle wanders; unusual noise; jerky on turn.	☐	☐
Brakes	Grab; pull to left or right; spongey; squealing.	☐	☐
Suspension	Unusual noise; too bouncy, not stable; noticeable vibration.	☐	☐
Acceleration	Rough, uneven, hesitates; cuts out.	☐	☐

Figure I-6. Key Indicator Chart (Continued)

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES

PREPARING TO DRIVE

General Procedures to Increase Driving Ease and Safety

A. Safety checks and adjustments.

B. Appropriate starting procedures.

C. Precautions before moving.

Making Safety Checks and Adjustments

A. Safety belts and shoulder harnesses.

1. Why wear them?

a. Restraints reduce the likelihood of serious injury or death.

- Nine to twelve thousand lives could be saved every year if all drivers conscientiously buckled up.

- Occupants who are thrown from vehicles during collisions have an extremely high fatality rate. Occupants wearing restraints are almost never thrown from the vehicle.

b. Restraints improve operator's ability to control the vehicle.

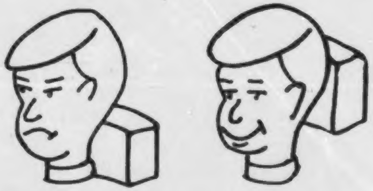
-Ask the trainees how properly adjusted restraints can improve vehicle control. Lead them to the following conclusions:

- Restraints keep the driver in position during sharp turns, etc.

NOTES

* * * BEGIN MODULE 2 * * *

TSG - I-D-13

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES	NOTES
• Restraints will keep the driver from being thrown from the vehicle in the event of a collision.	TSG - I-D-13
2. Proper adjustment for occupant restraints:	
a. Lap belt: snug across lower pelvis--not across stomach.	
b. Shoulder harness: loose enough that a fist can fit between harness and chest.	
B. Head restraints.	
1. Why use them?	
a. Help prevent neck and spinal injuries.	
b. Help the operator stay in position in a collision.	
2. Proper adjustment for head restraints: center of restraint positioned at the back of the skull--NOT at the base of the neck where it could serve as a fulcrum and snap the neck if the vehicle is struck from the rear.	TSG - I-D-14
• If the head restraint is too low, the neck could be broken (when head snaps back) if force of impact is great. 	

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES

NOTES

C. Seat position--when properly adjusted:

TSG - I-D-14

1. Brake and accelerator can be applied without fully extending the leg.
2. Steering wheel can be held with only a slight bend at the elbows.
3. The seat is fully locked into position.

   - A seat that slips out of position due to faulty mechanism or faulty adjustment can cause the operator to lose control.

D. Mirrors. The drawing on the next page illustrates the following points:

TSG - I-D-15
PRESENT TRANSPARENCY 3

1. Proper adjustment:

   a. Inside, rear-view mirror:

      1) Entire rear window visible with head in normal driving position.

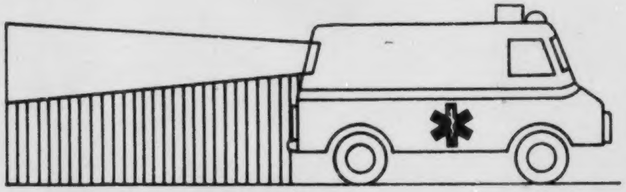
      2) Vehicle directly behind EV should be centered in mirror.

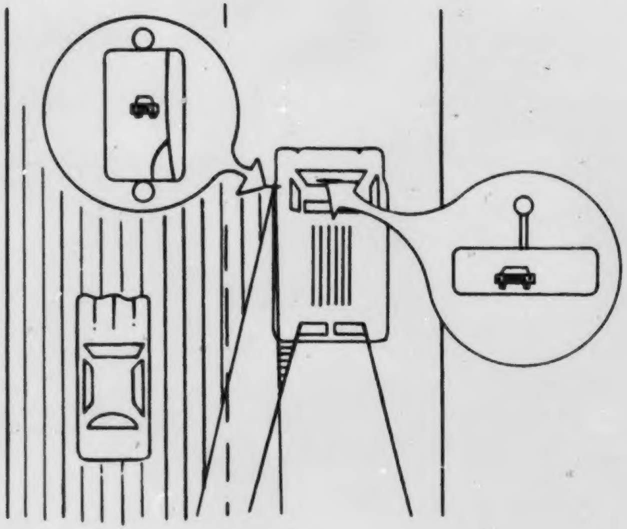
TSG - I-D-16

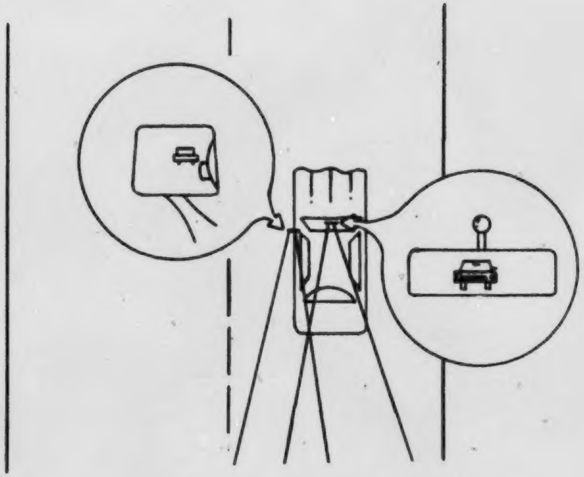
   b. Outside, side-view mirror:

      1) Edge of EV's rear fender and side lanes visible.

      2) Before a passing vehicle's image leaves rear-view mirror, it would be visible in side-view mirror.







▥ Blind Spot

2. Blind spots.

   - In all vehicles the most dangerous blind spots are by the rear quarter panels.

   - In larger vehicles (vans and trucks) there are generally blind spots below the rear window.

Start-up Procedures

-If trainees will all be driving the same type of EV on the job, go over the starting procedures according to the operator's manual.

-If trainees will be driving more than one type of vehicle, use the start-up procedures A-F below. Explain to the trainees that there may be minor differences between these procedures and the specific ones for their particular vehicle--they should check the operator's manual once on the job.

A. Transmission in "neutral" ("park" on automatic transmissions).

B. Depress clutch if manual transmission.

   - This facilitates turning engine over on cold days and keeps the vehicle from lurching forward if not in "neutral."

C. Start engine per manufacturer's recommendations for setting choke/starting aids on hot or cold engine.

D. If engine sputters, or won't start right away, avoid reengaging starter until engine is completely stopped.

-For diesels and heavy gasoline engines, a variety of starting aids exist. If many trainees will be operating such vehicles, use operator's manual to explain uses and procedures.

TSG - I-D-16

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES

E. Once engine starts, check:

- Charging system.
- Oil pressure.
- Dash indicator lights (out in five seconds?).
- Gauges (stabilized in satisfactory range?).

F. Release parking brake before attempting to move vehicle.

Precautions Before Moving

A. Standard, audible signal from last crew member to ensure all are aboard.

B. Only one other person (besides operator) in front seat or control cab.

C. Station doors opened, no obstacles in vehicle's path.

-If station doors are set on timers, trainees should find out what the timing intervals are. Point out the dangers of timed doors.

NOTES

TSG - I-D-17

* * END OF MODULE 2 * *

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES

PRACTICE IN INSPECTION, MAINTENANCE, AND PRE-START PROCEDURES

A. Instructor demonstration of inspection procedures.

B. Trainee performance of inspection procedures.

C. Instructor demonstration of maintenance/repair procedures (if relevant).

D. Trainee performance of maintenance/repair procedures (if relevant).

E. Instructor demonstration of pre-start procedures.

F. Trainee performance of pre-start procedures.

NOTES

* * * BEGIN MODULE 3 * * *

TSG - I-D-18

Guidelines For Demonstrating Inspection, Maintenance, and Pre-Start Procedures

A. Inspection.

1. Use the Inspection Checklist and go over every item.
2. For every item, point out the key indicators whether or not they represent a problem on that particular vehicle.
3. Keep the trainees directly involved in the demonstration. Some ways to do this are:
    a. For any given item, ask the trainees what the key indicators are.
    b. Ask the trainees to make judgments about the key indicators (e.g., tread depth).

B. Maintenance. Any maintenance activity likely to be performed by an emergency vehicle operator can be proceduralized (e.g., changing a tire). Before demonstrating, you should have the procedure in mind (preferably written down) and broken into logical steps. Be particularly sure to point out any safety precautions (e.g., placing chocks before changing a tire).

C. Preparing to Drive. Using the criteria outlined in this unit, demonstrate the proper adjustment of the following:

1. Seat position (trainees have not done it properly unless seat is locked into position).
2. Head restraint (center of skull).
3. Lap belt (snug across lower pelvis--NOT stomach).
4. Shoulder harness (fist between harness and chest?).
5. All mirrors (per pictures in text and specific vehicle requirements).

* * END OF MODULE 3 * *

Review Exercises

Answer the following true/false questions:	T	F
1. You should inspect your vehicle once a week, at the end of a shift.		x
2. Loose objects such as paper cups, newspapers, flashlights, etc. should be removed from the passenger compartment or secured.	x	
3. Springs and shock absorbers are part of the suspension system.	x	
4. If the gas gauge indicates below 3/4 full, it is a good idea to have the tank filled.	x	
5. If you are working a daylight shift, it is not necessary to have a vehicle with a burned-out headlamp serviced.		x
6. When a vehicle tends to wander due to steering problems, it is safe for emergency operation.		x
7. A tire with a bubble by the rim does not have to be replaced as long as the tread-wear indicator is not showing.		x
8. If your lights are dim, the vehicle is safe for emergency operation.		x
9. If the vehicle swerves when you apply the brakes, it could mean that the wheels are not braking evenly.	x	

10. List two key indicators of problem/malfunction for each of the following items:

a. Tires

-Tread-wear indicator visible
-Uneven tread wear
-Breaks, cracks, bubbles in sidewalls
-Pressure does not meet manufacturer's specifications

b. Steering

-Wheel turns more than 1/8 turn without response
-Vehicle wanders
-Unusual noises
-Jerky on wheel turn

c. Belts

-Cracked, frayed
-Loose, depresses more than one inch at center
-Tight, glazed surface, frayed

d. Seat belt

-Not bolted to floor
-Badly frayed
-Will not hold adjustment
-Will not pull out fully

e. Brakes

-Grab
-Pull to one side
-Spongy
-Squeal, scream

Description of Unit

This unit contains one module which presents knowledge about the physical forces that influence vehicle control.

Module 1 - 60 Minutes

1. INTRODUCTION. A brief overview of unit content.
2. MAJOR PHYSICAL FORCES. Physical forces covered here include friction, inertia and momentum, and centrifugal force as they relate to vehicle handling.
3. WEIGHT TRANSFER. The concept of "weight transfer" as it relates to speed and directional control is presented in this section.

Review Exercises - 20 Minutes

Written review questions on materials presented in this unit. Time estimate allows for discussion and explanation after trainees have completed the exercises.

Trainees' Knowledge Objectives

Module 1

By the end of this module, the trainees:

1. Will be able to write a brief description of the following terms:
    a. Velocity
    b. Centrifugal force
    c. Inertia
    d. Friction
2. Will be able to indicate on a drawing the effects of acceleration, deceleration, and turning on a vehicle's weight distribution.
3. Will be able to state the primary cause of brake fade.

Instructor Preparation Activities

Module 1

1. Read over the entire module and be prepared to lead a class discussion based on those materials.
2. Preparation for I-E-8. Look over the description of brake fade for drum and disc brakes. If you can find out what kind of vehicles the trainees will drive on the job, relate the discussion to their particular vehicles.

Equipment: Chalkboard and chalk. Overhead projector.

Materials: Transparency Nos. 4 and 5.

Additional Resource Documents:

Bibliography and reference nos.: 1, 8, 15.

INTRODUCTION

* * * BEGIN MODULE 1 * * *

A. While driving, operator can control velocity and direction only.

TSG - I-E-2

1. Velocity control is control of the EV's rate of motion or speed.

   - Acceleration, deceleration, braking.

2. Directional control is the control of the direction the EV will travel.

   - Steering, turning, "tracking" curves in the road.

B. Several physical forces influence the amount of control the operator has. If the limits created by the physical force are not exceeded, the operator can fully control both the EV's velocity and direction. If they are exceeded, control will be lost.

-Have the trainees think of examples where the operator could exceed their limits and lose control.

- Driving too fast for weather, road, or tire conditions.
- Accelerating too hard.
- Braking inappropriately.
- Changing direction too abruptly.
- Tracking a curve at too high a speed.

C. The key for EV operators is to know the conditions under which these limits are reached and, thus, when ability to control the vehicle will be lost.

UNIT TITLE	IMPORTANT PHYSICAL FORCES AND EV CONTROL	**UNIT PAGE**	I-E-5

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES	NOTES

MAJOR PHYSICAL FORCES

TSG - 3

The most important physical forces for EV control are friction, momentum and inertia, and centrifugal force.

Friction

A. What is friction?

1. Friction is the resistance to slipping.
2. Friction occurs whenever two surfaces "rub" together.

B. Friction occurs throughout the EV.

-*Have trainees think of examples.*

CHALKBOARD

- •Operator's hands and the steering wheel.
- •Engine parts rubbing together.
- •Gears meshing.
- •Tires and the road surface.
- •Brake shoes or pads rubbing on drum or disc.

-*Point out that without friction, vehicle control would be impossible. Friction enables the EV to stop, accelerate, and change direction.*

C. For vehicle control, the most important areas of friction are:

1. Between tires and road.

2. Between the brakes and the wheels.

TSG - 3

D. Friction between the tires and the road.

1. If there were no friction between the tires and the road, the EV would slide all over the place. Vehicle control would be impossible.

2. The amount of friction between the tires and road depends on many things, some of which the EV operator can control.

a. Tire size, tread, type, inflation, etc.

- Best to follow vehicle manufacturers' specifications here.

b. Amount of rolling the tires do. Friction is:

TSG - 4

1) Greatest--when the wheels and vehicle are stationary.

2) Very good--when the wheel is rolling on a dry, smooth road surface.

3) Least--when the wheel is locked or spinning.

E. Friction at the brakes.

1. The shoes pressing on the drums (or the pads clamping the disc) create friction and slow the wheel.

2. The friction at the brake surfaces generates heat.

- Like rubbing sticks together to make a fire.
- Rubbing your hands together to warm them up.

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES

NOTES

TSG - 4

3. As heat increases, braking ability goes down.

4. Brake fade is one of the worst consequences of heat due to excessive, hard braking.

   a. When sustained (hard) braking heats up the brakes sufficiently, the pedal-force requirements go up dramatically. In extreme cases, during hard application of brakes, the brakes may suddenly "disappear." The vehicle will continue forward as if no brakes were being applied. At best it's a scary situation, at worst it's deadly.

   b. Brake fade can occur in a variety of ways. In all cases, however, the cause is excessive heat.

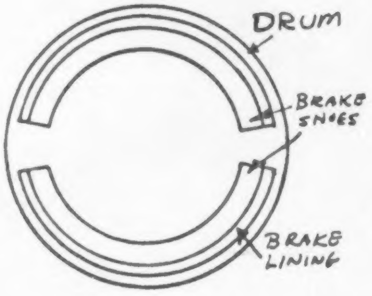
      - If the heat reaches 700°F or more, the bonding material of the brake lining melts and acts like a lubricant.

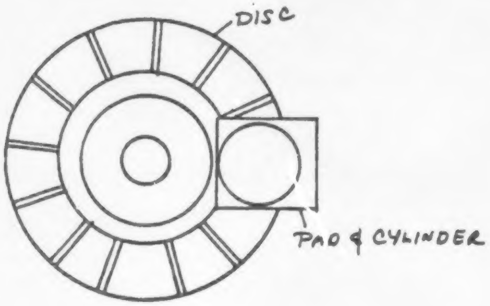
      - For some brake lining materials a gas is generated under high heat conditions. The gas can also act as a lubricant.

      - If the brake fluid becomes too hot it will expand and reduce braking effectiveness.

      - When the brake lining materials are more than one-half gone, the metal frame holding the lining material heats excessively and transfers the heat to the fluid.

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES





1) Drum brakes--almost 90 percent of the total drum surface is in contact with the brake shoe at one time. Thus, only about 10 percent of the surface can be cooling off at one time. The brake drums can heat up and expand to the point where it is impossible for the shoes to make good contact with the drums.

2) Disc brakes--since the pad makes contact with only about 15 percent of the disc surface, about 85 percent of the disc surface is cooling. Disc brake design permits much more cooling. Even if the disc were to get hot, it usually expands and makes better contact with the disc pads.

- The biggest cause of brake fade in disc brakes is worn pads which allow heat to transfer to the hydraulic fluid. Disc pads that are 50 percent worn have a 300 percent greater chance of causing fade.

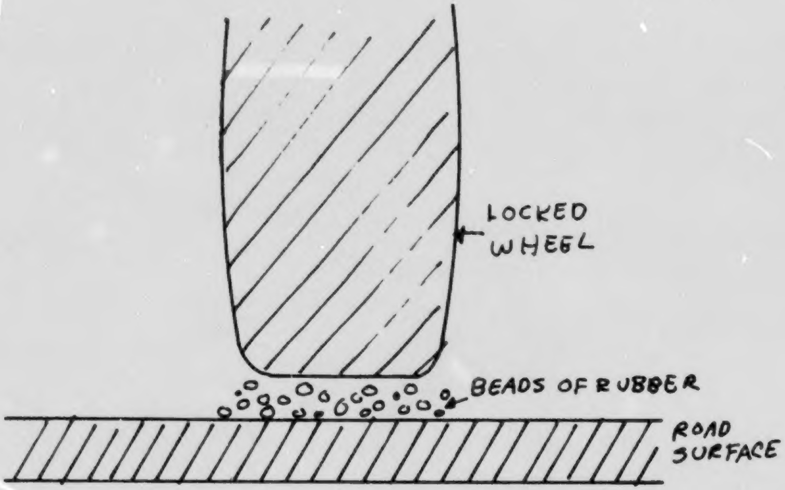
NOTES

TSG - 5

PRESENT TRANSPARENCY 4a

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES	NOTES
•In extreme cases, the heat can cause the disc to warp, leading to uneven braking.	TSG - 5
F. Velocity control and friction.	
1. Accelerating.	
a. Spinning the wheels reduces friction. Acceleration is slowed.	
b. Spinning the wheels smooths the tires. The friction between the tires and road surface will be less in the future.	TSG - 6
2. Braking.	
a. Shortest stopping distance is achieved by braking so that wheels do not lock up and skid.	
•Best braking point is just short of locking the wheels.	
•Difficult to hit exactly that point.	
•May have to pump or jab the brakes.	
b. Locking the wheels. One of the reasons locked wheels have less friction than rolling wheels is illustrated on the following page.	

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES



Little beads of rubber come off the locked, skidding tires and act as ball bearings for the vehicle to slide on.

G. Changing direction and friction.

1. Friction between the tires and road surface is required, if the operator is to control the EV's direction.

2. Tires must be rolling to change the EV's direction.

   - If brakes lock the front wheels, turning the steering wheel will have no impact on the direction the EV travels.

   - Directional control is possible only after brakes are let off and the front wheels begin to roll again.

NOTES

TSG - 6

PRESENT TRANSPARENCY 4b

TSG - 7

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES

NOTES

-*Emphasize that directional control is impossible if the front wheels are locked. This applies on any road surface, but trainees may have noted it on icy roads.*

TSG - 7

Momentum and Inertia

A. Momentum is the product of a vehicle's mass (weight) times its velocity (speed).

B. Inertia is the force that makes a moving EV tend to stay in motion in the same direction.

C. As momentum increases, it is harder to overcome the effects of inertia.

-*Explain how larger (heavier) EVs, having greater mass, will have greater momentum at a given speed. Ask the trainees what this means in terms of velocity and directional control.*

D. Momentum and inertia affect velocity control.

- With increased momentum, stopping distance increases.
- With increased momentum, brakes must work harder, friction and heat must increase.

E. Momentum and inertia affect directional control.

- With increased momentum, inertia will be harder to overcome. Therefore, changing direction is more difficult.
- As momentum increases, the track the EV will follow must be wider.

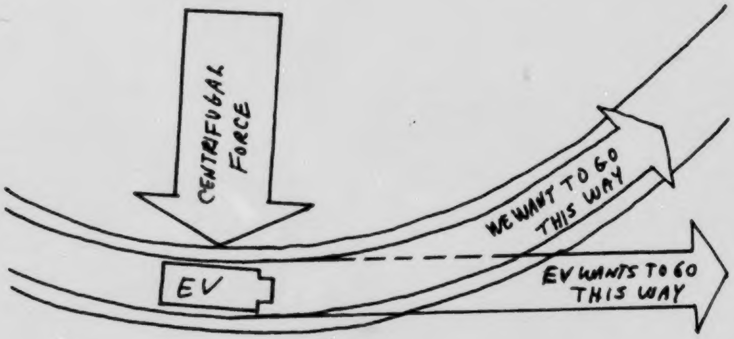
-*Draw a curved road on the chalkboard. Illustrate the way the track must widen as speed increases.*

CHALKBOARD

Centrifugal Force

A. Centrifugal force is the force that tends to push a vehicle traveling around a curve away from the center of the turning radius.

- The child twirling a bucket full of water around his head illustrates this force. The water stays in the bucket.



- Drivers can feel the centrifugal force when the vehicle negotiates a curve. It is a "push" from the inside of the curve, outward.

-Ask the trainees what other physical force makes the vehicle tend to go straight as in the illustration above. (Answer: inertia.)

B. Centrifugal force is influenced by both speed and the radius of the curve.

1. Higher speed, greater centrifugal force.

TSG - I-E-8

PRESENT TRANSPARENCY 5a

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES	NOTES
•Centrifugal force increases four-fold as speed doubles. For example: given a 3,000-pound vehicle entering a 500-foot radius curve: •At 30 mph, centrifugal force equals 350 pounds. •At 60 mph, centrifugal force equals 1,400 pounds.	TSG - I-E-8
2. Tighter curve, greater centrifugal force. •As the curve's radius is decreased, the centrifugal force at a given speed is greater and greater. Thus, the above 500-foot curve can be traveled at more than 60 mph. But control will be lost in a 250-foot curve at less than 50 mph.	
-Ask the trainees what force helps overcome centrifugal force. (Answer: friction. Also, gravity.)	

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES

WEIGHT TRANSFER

Definition

A. Every time an EV accelerates, decelerates, or changes direction, the weight distribution of the vehicle shifts.

B. This shift of weight is called weight transfer.

C. Effective use of weight transfer is critical for safe handling of an EV.

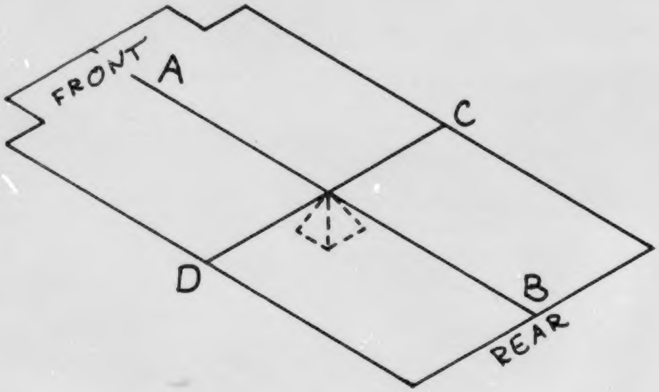
- Weight transfer wins or loses on the race track.
- Weight transfer will keep you alive on the road.
- In a moving vehicle if the EV operator changes the velocity, the direction, or both, weight can transfer to the front or rear, either side, or to any corner.
- Specifically where the weight transfers to, depends on the kind of change the operator makes.

Effects of Changing Velocity on Weight Transfer

-Ask the trainees to predict what will happen to the downward force of the vehicle for each of these actions.

NOTES

TSG - I-E-9



Imagine a fulcrum under the vehicle's center of gravity.

A. Accelerating.

- Downward force at B (rear) is increased.
- More weight and traction at rear tires (unless wheels are spinning).

B. Braking or decelerating.

- Downward force at A (front) is increased.
- More weight on the front tires.
- Possibly better steering control due to increased "bite" of front tires.

TSG - I-E-9

PRESENT TRANSPARENCY 5b

TSG - I-E-10

Effects of Changing Direction on Weight Transfer

TSG - I-E-10

A. We are all familiar with the way a vehicle leans in a curve. This lean is because of increased downward force on one side of the vehicle.

-Ask the trainees to predict what will happen to the downward force in the vehicle during right and left turns.

B. Right-hand turns.

- Downward force at D (left side) is greater.

C. Left-hand turns.

- Downward force at C (right side) is greater.

-Ask the trainees to describe the forces which make the vehicle lean left in a right turn and lean right in a left turn.

- Centrifugal force and inertia "push" the vehicle away from the center of the curve.
- Thus, the vehicle leans to the outside of the curve.

-If appropriate for this group of trainees, explain the special considerations applying to vehicles with a high center of gravity or with "live" loads.

- With a high center of gravity the "lean" is more pronounced and the possibility of rolling over increased.
- Vehicles with "live" loads, such as pumpers with unbaffled water, can be pushed from the intended track as weight shifts.

-Ask the trainees what happens in a high speed sharp right-hand turn if the brakes are suddenly applied.

TSG - I-E-10

- Because of the centrifugal force, most of the weight is on the left side tires.
- When brakes are applied still more of the vehicle's weight transfers to the front.
- Thus, most of the weight is on the front left tire.
- Two possibilities are: (1) The left front tire can tear off the rim and (2) the front left tire will act like a pivot and the vehicle will spin out of control around that tire.

The Suspension and Weight Transfer

TSG - I-E-11

A. The EV's suspension works to balance the forces (during a change in direction or velocity).

- Smooth out weight transfer (make it more gradual).
- Keep all four wheels firmly on the ground.
- Keep the vehicle level.

B. When changing the vehicle direction, good drivers work with the suspension, not against it.

- They slow up or widen the track if the vehicle is leaning too much.
- They avoid abrupt changes in direction or velocity which could shift vehicle's weight suddenly and cause the suspension to overreact (possible loss of control).

* * END OF MODULE 1 * *

Review Exercises

1. Write a brief description of each of the following terms:

   a. Velocity:

   Rate of motion or speed.

   b. Centrifugal force:

   The force that pushes an object (vehicle) away from the center of its turning radius.

   c. Inertia:

   Inertia is the physical force that causes a moving object (vehicle) tend to stay in motion, in the same direction.

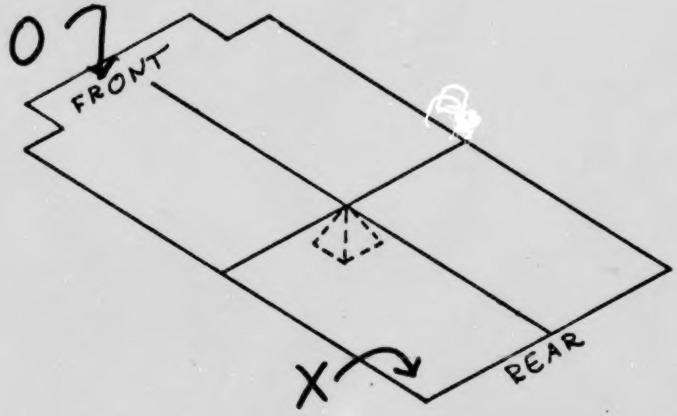
   d. Friction:

   The resistance to slipping; or, the rubbing together of two surfaces.

2. On the drawing below:

   a. Put an "X" on the place that the downward force would be greatest if you were accelerating through a right turn.

   b. Put a "O" on the place that the downward force would be greatest if you were braking.



3. State the primary cause of brake fade.

   Heat, due to extended, hard braking.

Description of Unit

This unit is the longest of the course. It covers all aspects of the actual operation of emergency vehicles.

Module 1 - 20-30 Minutes

1. CONTENT/STRUCTURE OF THIS UNIT. A brief outline of unit content.
2. USE OF LIGHTS AND SIREN. Including legal aspects and techniques for use of lights and siren.

Module 2 - 30 Minutes

1. BASIC CONTROL TASKS. The two topics covered in this module are backing up and parking.

Module 3 - 20-30 Minutes

1. URBAN DRIVING. This module covers urban driving, with heavy emphasis on urban driving in the emergency mode.

Module 4 - 40-60 Minutes

1. NEGOTIATING INTERSECTIONS. This module emphasizes the procedure for and importance of negotiating intersections, particularly when traveling in the emergency mode. The end of the module consists of several pages of practice.

Description of Unit (Continued)

Module 5 - 20-30 Minutes

1. TURNING AROUND TO REVERSE DIRECTION. This module includes procedures and cautions for three separate categories of turnabouts: U-turns, two-point turnabouts, and three-point turnabouts.

Module 6 - 30-40 Minutes

1. FOLLOWING ANOTHER VEHICLE. This module provides standards and procedures for estimating following distance. It also includes a discussion of stopping distance and practice exercises.

Module 7 - 45 Minutes

1. PASSING ANOTHER VEHICLE. Includes judgments to make before passing, exact procedure for executing a passing maneuver, tips to avoid mishap, and some considerations that apply when being passed.

Module 8 - 45 Minutes

1. EXPRESSWAY OPERATION. Includes entering/exiting expressways, cloverleafs, acceleration/deceleration lanes, beltways, and "driving at the limit."

Module 9 - 60 Minutes

1. DRIVING AT HIGH SPEED. Coverage in this module is geared to emergency mode operation--techniques for operation at speeds in excess of the limit.

Description of Unit (Continued)

Review Exercises - 45 Minutes

Written review questions on material presented in the nine modules of this unit. Time estimate allows for discussion and explanation after trainees have completed exercises.

Trainees' Knowledge Objectives

Module 1

By the end of this module, the trainees:

1. Will be able to state the purpose of emergency signaling equipment.
2. Given a list of statements relating to use of emergency signaling equipment, will be able to identify those statements that are correct.

Module 2

By the end of this module, the trainees:

1. Will be able to state the correct wheel position for a vehicle that is parked on a slope.
2. Given a description of a backing mishap, will be able to describe actions that might have been taken to avoid the accident.

Module 3

By the end of this module, the trainees:

1. Will be able to describe the provisions of their state's statute that deals with motorists' responsibilities for clearing a path for emergency vehicles.
2. Will be able to select the appropriate siren-use technique for negotiating through heavy or blocked traffic.

Trainees' Knowledge Objectives (Continued)

Module 4

By the end of this module, the trainees:

1. Will be able to identify the correct percentage of emergency vehicle accidents that occur at intersections.
2. Will be able to select the appropriate method for checking traffic before attempting to cross an intersection.
3. Will be able to state the kind of turn (left or right) which requires a larger gap in cross-traffic and explain why.

Module 5

By the end of this module, the trainees:

1. Will be able to name the safest type of turnabout.
2. Given three illustrations, will be able to illustrate the correct path for a vehicle making a U-turn.
3. Given an illustration of each, will be able to illustrate the correct path fcr a vehicle making a left and a right side-road turnabout.

Trainees' Knowledge Objectives (Continued)

Module 6

By the end of this module, the trainees:

1. Will be able to describe two methods of estimating following distance.
2. Given a list of several conditions, will be able to select those that indicate following distance should be increased.
3. Given a list of several statements relating to following distance, will be able to identify those that are correct.

Module 7

By the end of this module, the trainees:

1. Will be able to state two types of road configuration that indicate it is unsafe to pass.
2. Given a list of several conditions, will be able to select those that would indicate it is unsafe to pass.

Module 8

By the end of this module, the trainees:

1. Will be able to give an accurate explanation of what a "Yield" sign means.
2. Will be able to select the correct siren-use technique for entering/exiting expressways.

Trainees' Knowledge Objectives (Continued)

Module 9

By the end of this module, the trainees:

1. Given two drawings, will be able to select the one that illustrates a properly banked road.

2. Given a listing of several incomplete sentences relating to driving curved roads, will be able to insert the word that best completes the sentence.

3. Given an illustration of two vehicles' path of travel through a curve, will be able to select the vehicle that has chosen the safest path.

Instructor Preparation Activities

Module 1

1. Read over the entire module and be prepared to present a lecture on those materials.
2. Preparation for I-F-13. Bring a copy of the state statutes you prepared for Unit I-B to class so you will be prepared to provide information to trainees on emergency signaling equipment.
3. Preparation for I-F-14. If possible, obtain information on the type of emergency lights and siren the trainees' on-the-job vehicles will have. Also, obtain instructions for their operation and be prepared to discuss their operation in class.

Equipment: Chalkboard and chalk.

Materials: None

Module 2

1. Read over the entire module and be prepared to present a lecture on those materials; no additional preparation is required.

Equipment: Chalkboard and chalk. Overhead projector.

Materials: Transparency Nos. 6, 7, 8.

Instructor Preparation Activities (Continued)

Module 3

1. Read over the entire module and be prepared to present a lecture on those materials.
2. Preparation for I-F-26. Find out what your state's statutes say about motorists yielding the right-of-way to EVs (e.g., pull to curb). Be prepared to present this information in class.

Equipment: Chalkboard and chalk.

Materials: None

Module 4

1. Read over the entire module and be prepared to present a lecture on those materials; no additional preparation is required.

Equipment: Chalkboard and chalk. Overhead projector.

Materials: Transparency Nos. 9, 10, 11.

Module 5

1. Read over the entire module and be prepared to present a lecture on those materials.

Instructor Preparation Activities (Continued)

2. Preparation for I-F-41. Find out the approximate turning radius of the EVs the trainees will operate on the job, and figure out how many 12' lanes those vehicles would require for a U-turn. Be prepared to present this information in class.

Equipment: Chalkboard and chalk. Overhead projector.

Materials: Transparency Nos. 12, 13, 14, 15.

Module 6

1. Read over the entire module and be prepared to present a lecture on those materials; no additional preparation is required.

Equipment: Chalkboard and chalk. Overhead projector.

Materials: Transparency No. 16.

Module 7

1. Read over the entire module and be prepared to present a lecture on those materials; no additional preparation is required.

Equipment: Chalkboard and chalk.

Materials: None.

Instructor Preparation Activities (Continued)

Module 8

1. Read over the entire module and be prepared to present a lecture on those materials; no additional preparation is required.

Equipment: Chalkboard and chalk. Overhead projector.

Materials: Transparency Nos. 17, 18.

Module 9

1. Read over the entire module and be prepared to present a lecture on those materials.
2. Preparation for I-F-84. Find out the local or departmental policy regarding high-speed EV operation. Be prepared to present this information in class.

Equipment: Chalkboard and chalk. Overhead projector.

Materials: Transparency No. 19.

Review Exercises

Question 5. The answer to this question does not appear in your copy of the Review Exercises. because it is dependent on your state's statutes. Find the answer in your State Motor Vehicle Code and note it on your copy of the Review Exercises so that you can present it in class.

Additional Resource Documents:

Bibliography and reference nos.: 3, 8, 15, 21, 38, 39, 68.

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES

CONTENT/STRUCTURE OF THIS UNIT

This unit, Operation, is the longest unit in the course. It covers all aspects of the actual operation of Emergency Vehicles. It is structured in terms of operating tasks.

-Go over the module titles (use Unit Description page) with the trainees. Mention:

- Heavy coverage in the proper way to accomplish each task under routine conditions is provided.
  - Most EV accidents do not occur when EV is in emergency mode.
- Concluding section of each module (except the last) is directed to special considerations for performing the operating tasks in the emergency mode.
- Last module (no. 9) covers operation at speeds in excess of the speed limit. The entire module applies, therefore, to operation in emergency mode.

NOTES

* * * BEGIN MODULE 1 * * *

TSG - I-F-5

USE OF LIGHTS AND SIREN

TSG - I-F-6

Legal Aspects

A. Lights and sirens are used to inform traffic of an EV's presence and thus, to aid in clearing a path for the EV.

- Due regard must always be exercised, even in the most serious of emergencies.

B. Most state laws require the EV to use emergency signaling equipment whenever any of the exemptions are exercised.

-Tell the trainees exactly what the laws in this state say. Be sure to point out:

- This does not mean that every time there is an emergency, signaling equipment must be used.
    - Whenever there is an emergency, if exemptions are not being exercised use of signaling equipment is at the operator's discretion.
- For instance, all signaling equipment would not be required if an ambulance were transporting a patient to a medical facility if the ambulance were traveling below the speed limit and obeying all other traffic laws. Patients having a heart attack should not be transported with siren operating.
    - If traffic were moving slowly the operator might elect to use emergency signaling equipment.

C. Use of signaling equipment doesn't guarantee operator safety, nor does it free him from the possibility of civil or criminal liability if a mishap does occur.

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES	**NOTES**
Lights	TSG - I-F-6

A. Particular type and configuration of emergency lights is set by law and local policy.

-*Review the locally applicable, specific light arrangements and policy for use of various configurations of emergency lights.*

B. Operating procedures.

-*Review operating procedures; controls, options, etc.*

C. Some limitations on emergency light usage.

1. Low sun or glare can greatly reduce effectiveness.
2. At night red beacons can be confused with traffic lights and neons.
3. Lights on high EVs may pass over motorists if EV is close to rear of vehicle ahead.

Siren	TSG - I-F-7

A. Particular type and siren options are set by law and local policy.

-*Review the capabilities of the specific type of siren the trainees will use.*

B. Operating procedures.

-*Review operating procedures; controls, options, etc.*

C. Limitations on siren usage.

1. Usually siren sound travels forward from the vehicle in a cone shape.

TSG - I-F-7

   a. The higher the frequency, the narrower the cone.

   b. The higher the frequency, the greater the distance the siren can be heard.

   c. The physical parameters that establish the effectiveness of sirens are: sound level and spectral content, directivity, propagation losses, vehicle insertion loss, and vehicle background noise level.

– Explain these terms:

- Vehicle insertion loss is the difference in sound level observed at the drivers position in a vehicle from that observed at the same location without the vehicle, for the same external noise source.

– Explain the implications:

- High frequency siren is better for alerting motorists at some distance ahead.
- A study has shown that existing sirens are effective only to vehicles traveling in the same direction ahead of the emergency vehicle, to vehicles weaving slowly through dense stationary traffic and to pedestrians.
- The mode of operation of the siren is not relevant to detection.

2. Sirens do not travel around buildings or corners very well.

- Turn off siren at intersections.

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES

NOTES

3. At high speeds it is possible to "out run" the siren.

   - This means that vehicles in front of EV won't hear the siren before EV reaches them.

4. Even at fairly close range, the siren may not be heard by a motorist with windows up, radio and air conditioner on.

General Guidelines for Using Lights and Siren

TSG - I-F-8

A. Ride with driver's window partly open at all times.

- Enables operator to hear other EVs, trains, approaching traffic, etc.
- Particularly important at intersections and railroad crossings.

B. In general, when activating siren, let up slightly on accelerator.

- Motorists respond in strange ways to a sudden siren. This gives the operator a bit more time and room to take appropriate action. Do not rely on the siren to clear the traffic.
- Watch for the reaction of other vehicles to the siren and be prepared to maneuver accordingly.
- Other drivers often have difficulty in determining the location of the siren.
- Presume that other drivers cannot hear the siren and maneuver accordingly.
- Particularly important in high-density traffic areas.

C. Turn siren off in high noise environments.

- Radio communication will be more difficult.
- EV operator won't hear anything else with his own siren fully on.

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES | **NOTES**

- To be effective, a siren must be about 10dB higher than background noise in the other vehicles. In high noise environments, a siren is only adding to the problem because other drivers are not apt to hear the signal anyway.

D. Vary the siren to avoid hypnotic effects.

– Explain to trainees the importance of learning to recognize the early signs of hyponosis

1. "Hypnotized" EV operators sometimes become vague and inattentive.
2. "Hypnotized" EV operators tend to take unnecessary risks.

- Preclude hypnosis by allowing short periods of siren silence.
- Preclude hypnosis by varying the intensity of the siren.

E. Do not use the siren when it is unlikely to be effective.

- When a road is lightly traveled, there is no reason to leave the siren operating.
- Use for warning pedestrians.
- Use in slow speed, low-background noise situations.

* * END OF MODULE 1 * *

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES

BASIC CONTROL TASKS

A. Directional and velocity control are accomplished by steering, accelerating, and braking.

B. These basic control tasks are all present in two slow-speed activities--backing and parking.

   1. Relatively simple tasks.

   2. Good performance requires practice.

- *Tell the trainees that they will have the opportunity to practice and build skill in these tasks later in the course (in Part III). Mention that this module provides some pointers and tips for accomplishing these tasks safely.*

Backing Up

Backing mishaps account for a large proportion of EV accidents.

- Most backing accidents are relatively minor. Even minor accidents, however, can have wide-ranging consequences:
  - Keep EVs out of service (while repairs are made).
  - Cause the operator a lot of paperwork (time).
  - Cost taxpayers money--EV operator's are taxpayers too!
  - Create a bad public image.

Techniques to minimize backing accidents require common sense. Take a few extra seconds; well worth it.

NOTES

* * * BEGIN MODULE 2 * * *

TSG - I-F-9

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES	NOTES
A. Park so backing is minimized or eliminated. To do this, the operator must plan ahead:	TSG - I-F-9
-*Ask the trainees what kinds of planning they could do. Include at least the following points:*	CHALKBOARD
•Don't park head-in if departure will be hurried.	
•Select places that require least backing.	
•Before entering a vehicle to be backed, survey intended path of vehicle.	
B. When vehicle must be backed:	
1. Station a crewmember outside vehicle to direct, if possible.	
•Crewmember should be to left rear of vehicle.	
2. Check for pedestrians and obstacles.	
3. Back SLOWLY (as if you expected to hit something).	
4. Constantly check mirrors for changes in the traffic situation or obstacles in EV's path.	TSG - I-F-10
5. When backing out of an alley, hidden driveway, etc., sound horn or "back-up alarm" for warning.	
•Points 4 and 5 are especially important for larger EVs.	
6. When turning while backing, check front fender to avoid front collision.	
•About 90 percent of the time operator should be looking to the rear.	

-*If convex mirrors are legal in your state, tell the trainees:*

TSG - I-F-10

- Properly positioned and adjusted, convex mirrors can be helpful in eliminating blind spots.

Parking

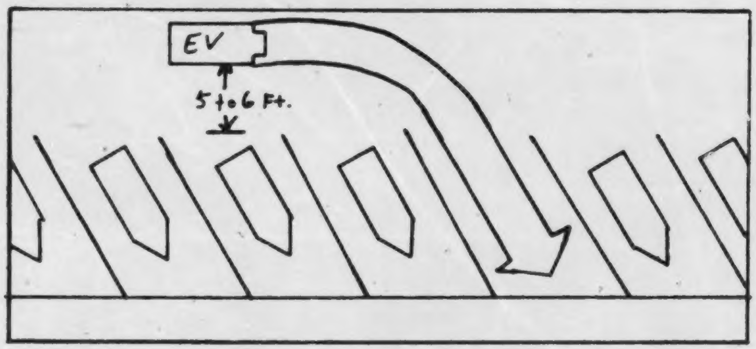
Three types: angle, perpendicular, and parallel.

- Parking is a basic control task, but requires many driving skills.
- Parking, when performed under stress can be difficult and time consuming.

-*Procedures for performing these parking maneuvers do not appear in the TSG. Suggest notetaking.*

A. Angle Parking

PRESENT TRANSPARENCY 6



- Procedure:

TSG - I-F-10

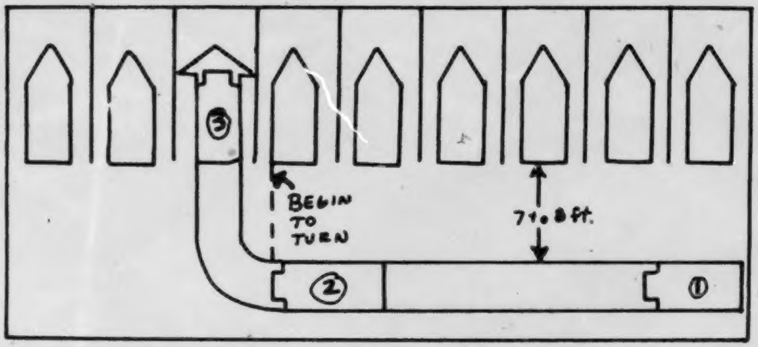
  - Slow to no more than 10 mph.
  - Keep sedan 5 to 6 feet from rear of other cars; appropriate distance for larger EVs is approximately 1/3 their length.
  - Begin turning wheels when EV's front wheels have cleared vehicle beside intended space.
  - REMEMBER: Front bumper and rear quarter panel will extend beyond the track of the wheels; the larger the EV the further the extension.

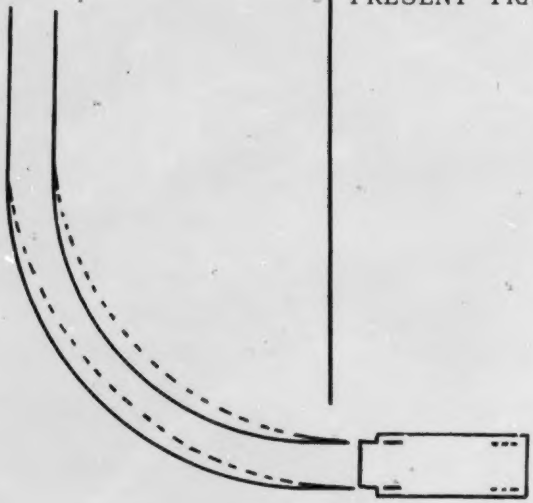
B. Perpendicular Parking.

TSG - I-F-11

1. Sedans and vans.

PRESENT TRANSPARENCY 7a



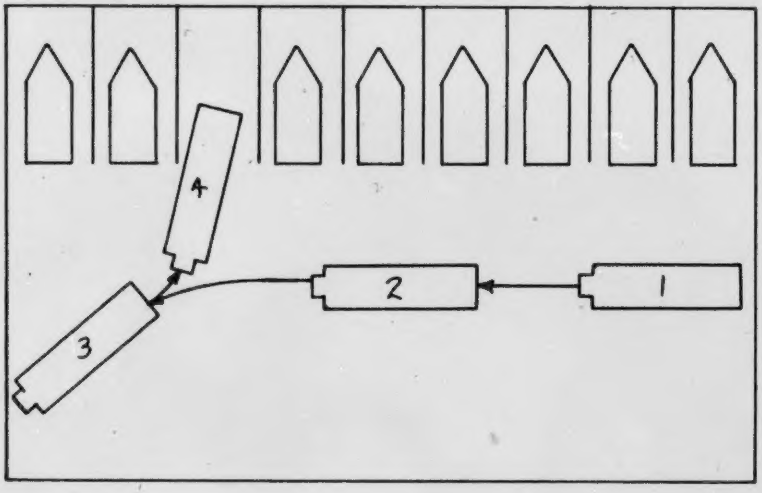


- Procedure:
  - Slow to no more than 10 mph.
  - Keep EV 7 to 8 feet from rear of parked vehicles.

- Begin turning wheels when EV's front bumper is in line with edge of vehicle closest to intended parking space.

- REMEMBER: Rear wheels track to the inside of front wheels, so to avoid mishap, enter the space straight, not at an angle.

2. Long wheel-base vehicles. (Large EVs such as fire apparatus almost never have to perform this maneuver.)



- Large vehicles usually are backed into perpendicular space.

TSG - I-F-11

PRESENT TRANSPARENCY 7b

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES | **NOTES**

C. Parallel Parking. Parallel parking requires a space at least 25 percent longer than EV. Operator must learn when to turn the wheels.

TSG - I-F-12

-The procedures shown in the transparency (illustrated on the next page) work best for ordinary sedans, but by extension can be applied to larger EVs. Use the transparency to explain the parallel parking procedure.

PRESENT TRANSPARENCY 8

D. Parallel Parking on Slopes (Special Considerations).

1. Set brake.
2. Leave vehicle in gear (if manual transmission).
3. If EV is large or heavy, place chocks.
4. Always position the front wheels so that if the vehicle starts to roll:
    a. Wheels will hit the curb (and prevent rolling).
    b. Vehicle cannot roll through traffic lanes.

Considerations: Backing and Parking in the Emergency Mode

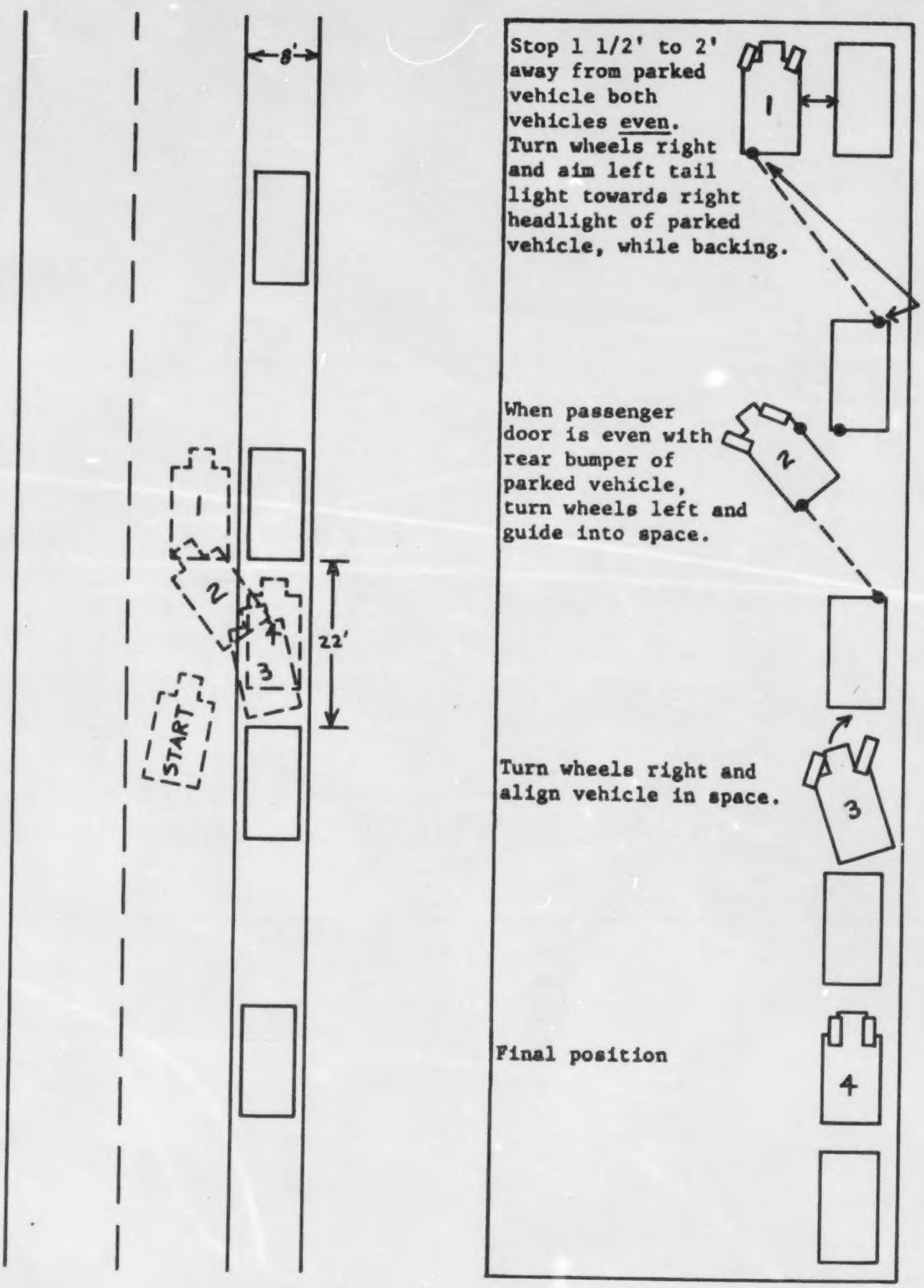
A. Backing or parking in emergency mode must be done quickly.

B. Requires skill to do it fast without mishap.

-Ask trainees what they can do to back or park most safely in emergency mode.

- Not push themselves beyond their own level of skill. Also, take time to do it properly; avoid the chance of a mishap which would greatly delay performing their mission.

* * END OF MODULE 2 * *



Stop 1 1/2' to 2' away from parked vehicle both vehicles even. Turn wheels right and aim left tail light towards right headlight of parked vehicle, while backing.

When passenger door is even with rear bumper of parked vehicle, turn wheels left and guide into space.

Turn wheels right and align vehicle in space.

Final position

Figure I-7. Parallel Parking.

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES

URBAN DRIVING

Introduction

A. Even in normal, non-emergency conditions, operating an EV in urban areas requires a high degree of skill.

- EV operators, public servants, must present good examples to other motorists and pedestrians.
- At any time EV may be called into emergency service. Accidents or delays could make EV unavailable for service.

B. Keys to successful urban driving:

1. Keep alert.
   - Children.
   - Alleys.
   - Exhaust from parked cars.
   - Cross walks.
2. Don't anticipate other motorists' actions.
   a. Motorists sometimes signal turns or lane changes when they don't mean to.
      - In spite of how they signal, note direction motorist looks, way vehicle is pointing, whether they slow properly, etc.

   b. Motorists may enter or cross traffic without sufficient gap.

NOTES

* * * BEGIN MODULE 3 * * *

TSG - I-F-14

c. Motorists may try to beat a light, going through as it changes.

TSG - I-F-14

-Point out to the trainees that effective drivers are constantly thinking "What if..." They have a general action plan in mind before a child pops out or a motorists pulls a crazy or unexpected stunt.

Considerations: Urban Driving in the Emergency Mode

A. Speeds in excess of limit are rarely justified--only in the most extreme emergency.

- Too much chance of unexpected motorist or pedestrian action that could lead to an accident.
- Reasonable speed allows more time to react to such actions and more opportunity to control the EV if evasive action is required.

B. Urban driving in emergency mode requires effective use of lights and sirens to:

1. Warn motorists and pedestrians of the approaching EV.
2. Clear traffic and/or help the operator negotiate through heavy or blocked traffic.

C. Typical motorists' reactions to lights and sirens in urban areas:

TSG - I-F-15

1. Generally, motorists will try to pull to the right and slow down or stop when they detect an approaching EV.
   - Most motorists are more than willing to pull over to miss a light or save a life.

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES	NOTES
-Clarify the state's requirements for motorists to yield the right of way to EVs. •Some newer statutes require motorists to pull to the curb. Many divided main roads (or one-way streets) have curbs on both sides. Consequently, in some states motorists may pull to the left.	TSG - I-F-15
2. Some motorists, however, will do senseless, unexpected things. A good EV operator is always aware of these possibilities.	
-Ask the trainees what kinds of unexpected things motorists might do. Have them note at least the following: •Stop dead in the middle of a lane, blocking the EV's forward progress. •Try to compete (race) with the EV, or beat the EV through an intersection. •Nothing at all. They will keep traveling at the same speed, apparently unaware of the EV's presence.	CHALKBOARD
-Remind the trainees that these persons may be truly unaware of the EV's presence; radio or air conditioner on; and failure to check the rear-view mirror can contribute to this.	
a. Confused motorists: •The best way to handle confused drivers is to lay off the siren, give them a chance to think. •Tap horn or flash lights to try to establish eye contact.	

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES | **NOTES**

TSG - I-F-15

- Once eye contact has been established, give hand or verbal signal indicating what action motorist should take. Be cautious--you can't totally depend on motorists understanding hand signals.
- May need to yell out instructions.

-If trainees will be driving ambulances, point out that if the siren is not being used (to avoid patient stress) it is unwise to yell, as this could also cause patient stress.

b. Unaware motorists:

- Beware of startling unsuspecting motorists; they could respond hazardously.
- Vary siren pitch and duration.
- Use headlights, horn, or spot to get attention.
- Have partner use P.A. to get attention.
- Be patient, keep signaling!
- Avoid passing on the right, unless it's the only way.
- In extreme cases, it may be necessary for a crewmember (never the driver) to get out of the vehicle and direct traffic.

D. If traffic is blocked:

-Explain that traffic blockages are often unavoidable, particularly during rush hours. Ask the trainees what can be done to reduce the chances of encountering blocked traffic. (Answer: Route planning, including alternate rush-hour routes.)

UNIT TITLE	OPERATION	**UNIT PAGE**	I-F-28

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES

1. Slow down before reaching blockage.

   - Gives a better view.

   - Easier to detect what effect the signaling equipment is having.

2. Use siren intermittently.

3. Be patient.

   - If traffic is unable to move, it does no good to keep the siren wailing constantly.

   - It could do some harm. Everyone involved is likely to become irritable and impatient.

4. Don't travel in opposing traffic lanes unless you know traffic is cleared for at least one block.

NOTES

TSG - I-F-15

* * END OF MODULE 3 * *

UNIT TITLE	OPERATION	**UNIT PAGE**	I-F-29

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES	**NOTES**
NEGOTIATING INTERSECTIONS	* * * BEGIN MODULE 4 * * *
Introduction	TSG - I-F-16
-*Write the following statistics on the chalkboard.*	CHALKBOARD

NEGOTIATING INTERSECTIONS

Introduction

Intersections are the most accident-likely areas.

-*Write the following statistics on the chalkboard.*

- Accidents at intersections:

All Motor Vehicles	Emergency Vehicles
37%	50%

-*Explain why over half of all EV accidents occur at intersections. Ask trainees to think of possible reasons. Include the following:*

- Many intersections restrict visibility.
- EV operators can misjudge traffic situation and clearance.
- Emergency mode:
  - Some motorists become confused at multi-lane or crowded intersections (especially when they have to respond to an EV).
  - Many motorists don't hear or see the approaching EV. Their "responses," therefore, are often totally unpredictable.
  - Two or more EVs, responding to the same call, often "meet" at intersections.

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES

NOTES

TSG - I-F-16

Techniques for Negotiating Intersections

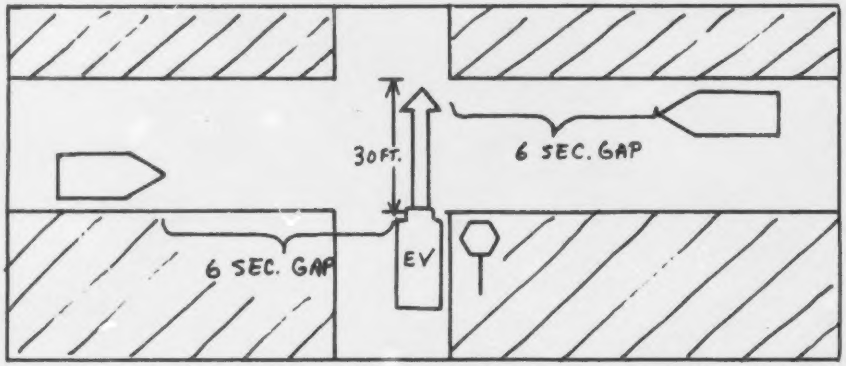
A. Before crossing an intersection EV operator must make sure there is an adequate gap in traffic.

1. From a full stop, EV needs about four seconds to cross an intersection 30 feet wide (2 lanes).

   - For larger vehicles time varies according to size, accelerative capability, etc.

2. Cars approaching from either direction should be about six second from intersection.

   - Operator should look left, then right, then left again before crossing an intersection.



PRESENT TRANSPARENCY 9a

B. Right turns at an intersection.

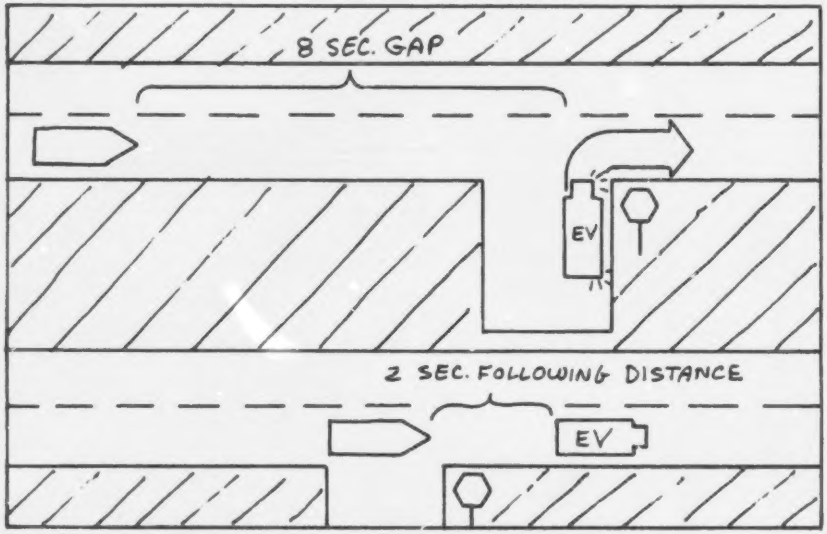
TSG - I-F-17

1. From a stop it takes about six seconds to turn right and accelerate to 30 mph.

2. When the operator begins the turn, any vehicle approaching the intersection from the left should be at least seven to eight seconds away from the intersection.

   - If a right turn is started with an eight-second gap, the vehicle approaching from the left will be a safe two seconds behind the EV once the turn and acceleration are completed.

3. In faster cross traffic, a larger gap is required for safety.



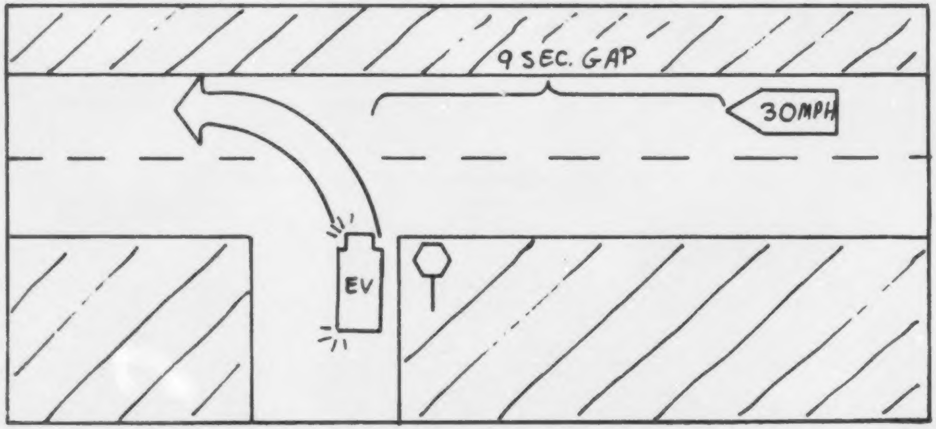
PRESENT TRANSPARENCY 9b

C. Left turns at intersections.

TSG - I-F-18

- Left turns require a larger gap than right turns because of the need to cross traffic lanes.

PRESENT TRANSPARENCY 9c



D. Gaps for turning at various cross-traffic speeds.

-Using the following table, present the information that is relevant to this particular class of trainees.

CHALKBOARD

Speed of Cross Traffic	Sedan		Van		Large Truck	
	L	R	L	R	L	R
30	9	8	10	9	11	10
40	10	9	11	10	12	11
50	12	11	13	12	14	13
55	13	12	14	13	15	14

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES

Considerations: Negotiating Intersections in the Emergency Mode

A. Siren should be turned off for a short period just before entering an intersection. This will:

1. Allow operator to hear other EVs.
2. Lessen the chances of a "panic" reaction by motorists at the intersection.

B. Provide as much information as possible to other motorists.

1. EV operator should use all means of signaling, including:
    a. Lights.
    b. Siren.

-Ask the trainees why lights and siren alone may not be sufficient warning for motorists.

- Windows up, air conditioner, radio on, etc.
- Sirens don't carry around corners very well.
- Low sun or glare can make emergency lights useless.

    c. Turn signals.
    d. Lane position.
    e. Eye contact or hand signals.

2. Signal intent at least 100 feet in advance of an urban intersection (200 feet in the country).

NOTES

TSG - I-F-18

TSG - I-F-19

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES

C. Check for traffic control indicators in advance of intersection.

- Lane markings.
- Signals.
- Stop or yield signs.
- Crosswalks.

D. Check for hazards well in advance of intersection.

1. Make sure driver's window is partly open--this will enable detection of other EVs, if in the vicinity.
2. Stay especially alert--search for:
   a. Actual hazards.

-Ask the trainees to think of examples of actual hazards.

- Bad road surface.
- Motorists in your lane.

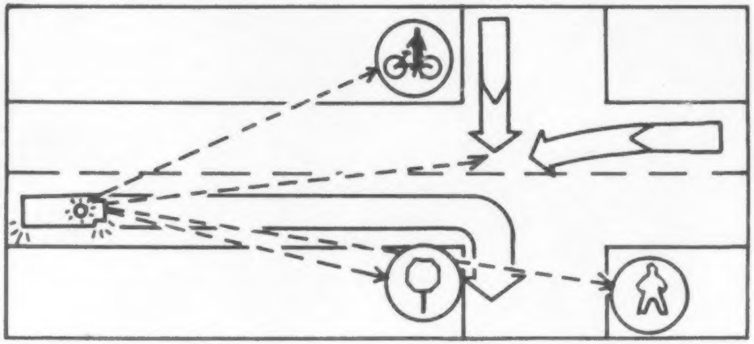
   b. Potential hazards.

-Ask trainees to think of examples of potential hazards.

- Bicyclists, pedestrians.

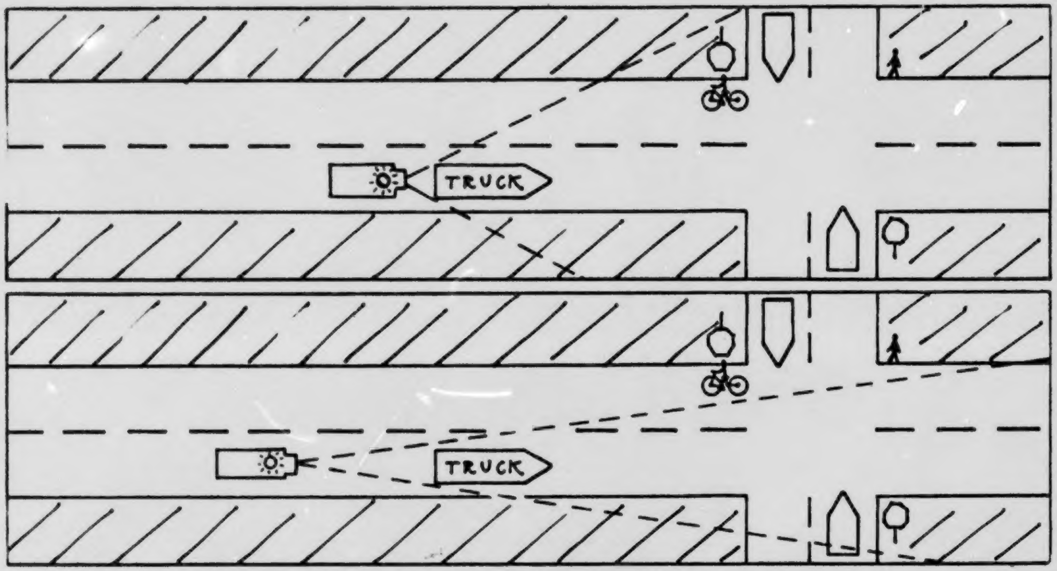
NOTES

TSG - I-F-19

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES	NOTES
E. Practice--you decide.	TSG - I-F-19
1. What are the hazards in the following situation?	TSG - I-F-20
	PRESENT TRANSPARENCY 10a
•Two moving vehicles are potential hazards. •Pedestrian and bicyclist are potential hazards.	

2. What are the effects of following too closely when approaching an intersection?

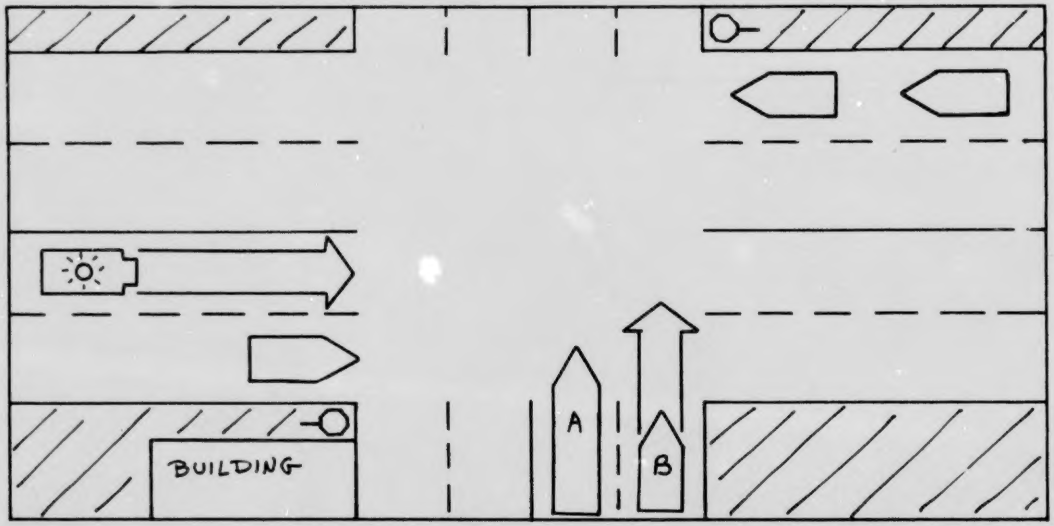
TSG - I-F-20



- Top picture: EV operator has limited his field of vision--he cannot see any of the potential hazards: bicyclist, pedestrian, or either vehicle that will cross the intersection.

- Bottom picture: All potential hazards and one of the stop signs can be seen by this EV operator who is following at a safer distance.

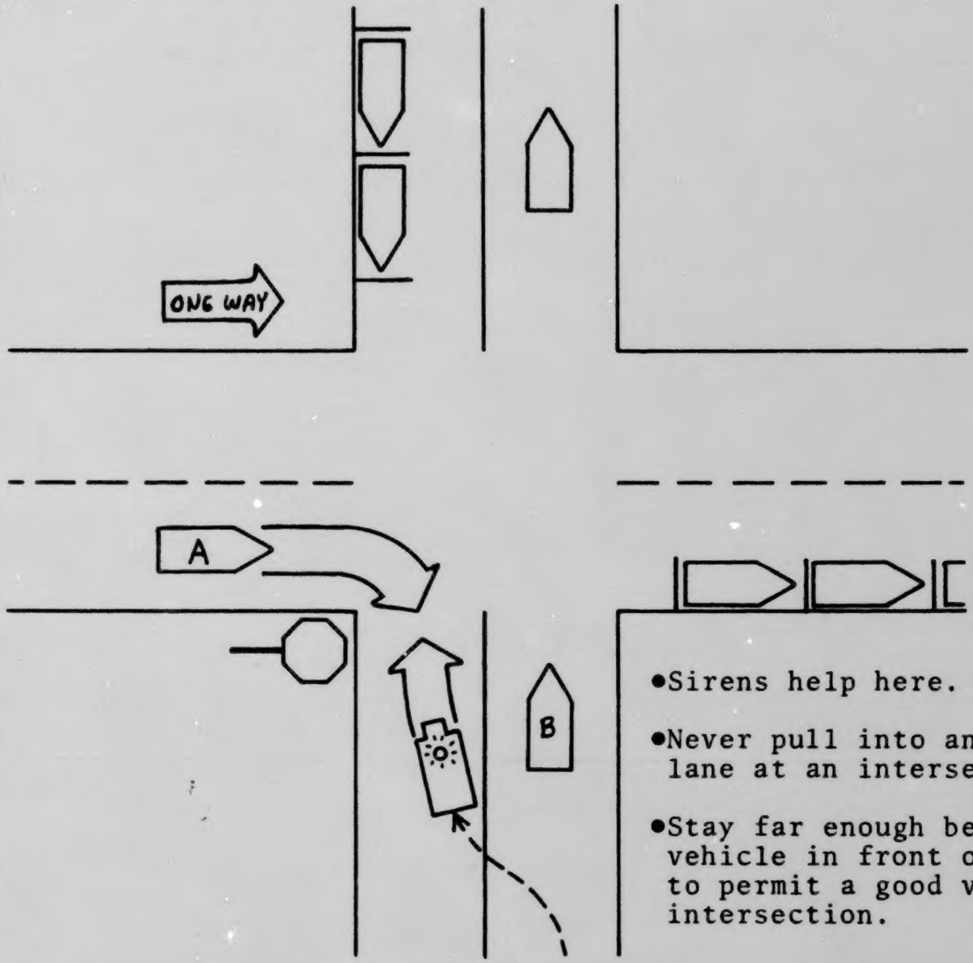
INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES	NOTES
3. Vehicle "A" is a large truck. Why is this EV operator in trouble? What problems does the building create?	TSG - I-F-21 PRESENT TRANSPARENCY 10b



- Vehicle B does not see or hear EV. (The building blocks most of the siren sound.)
- If the EV does not slow down almost to a stop at the intersection, a collision is probable.
- One useful trick is for the EV operator to look under the wheels of truck A. He might see B in time to take appropriate action.

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES

4. Driver "A" looks left before turning right. He doesn't expect any oncoming traffic from the right. How can the EV operator avoid such problems?



- Sirens help here.
- Never pull into an oncoming lane at an intersection.
- Stay far enough behind the vehicle in front of the EV to permit a good view of intersection.

NOTES

TSG - I-F-22

PRESENT TRANSPARENCY 11

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES

NOTES

5. How would you handle this situation--discussion.

TSG - I-F-23

Situation:

It can be hazardous when one EV operator follows another EV through an intersection. A motorist who has waited at the intersection and yielded to the first EV will, in many cases, proceed to drive through the intersection when the first EV has passed, not expecting the second EV to be so close behind, or perhaps not expecting it to be there at all. WHAT SHOULD AN EV OPERATOR, WHO IS FOLLOWING ANOTHER EV, DO?

-*Stop at the intersection, or slow until you are sure of other motorists' reactions.*

-*Use different siren pitch or warble than the lead EV is using.*

* * END OF MODULE 4 * *

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES

TURNING AROUND TO REVERSE DIRECTION

Turnabouts

A turnabout is the fastest way to turn around to the reverse direction.

A. Any kind of turnabout can create a hazardous situation when performed on a street.

- Turnabouts are illegal in some states unless the EV is in the emergency mode.
- In congested areas, going around the block may not only be safer, but also faster.

B. Choosing a safe location for a turnabout is important; choose an area with good visibility. You should have a clear view of the entire path of travel and all traffic lanes.

- Avoid hills, curves, and blind intersections.

C. Types of turnabouts (in order of increased hazard potential).

1. U-turns.
2. Two-point turns.
3. Three-point turns.
    - The Y-turn and bootleg turn should be avoided--they are hazardous.

NOTES

* * * BEGIN MODULE 5 * * *

TSG - I-F-24

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES

U-turns

A. U-turn is the least hazardous type of turnabout.

B. U-turn is easiest to perform but requires a wide roadway and good visibility.

C. U-turn is illegal in many areas. EVs are not exempt from this law unless they are in the emergency mode.

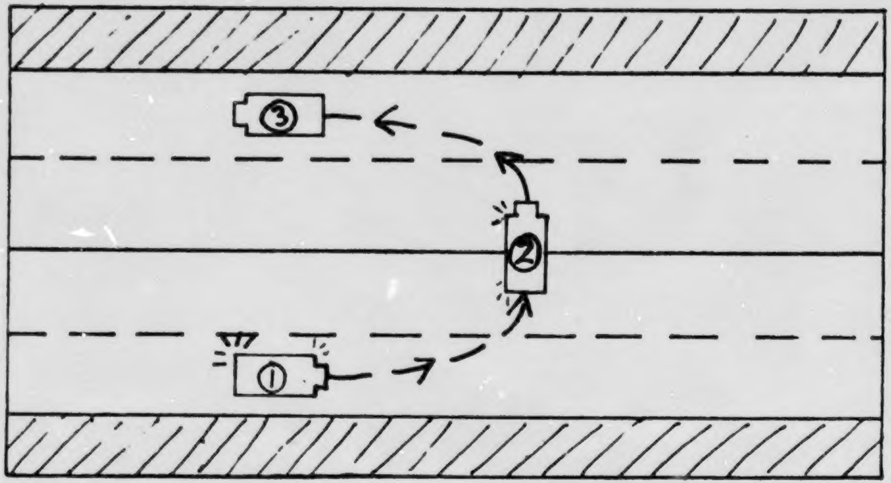
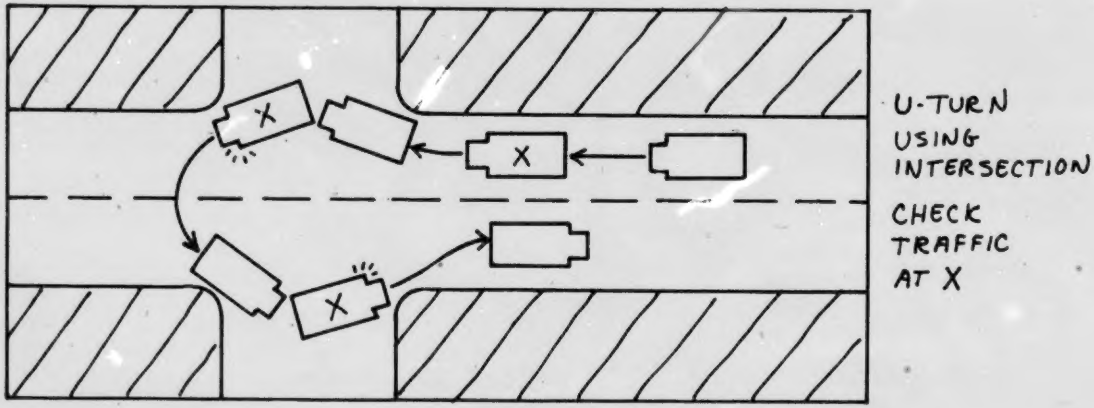
- *Using the approximate turning radius of the EVs the trainees will operate on the job, indicate the number of 12' lanes required for a U-turn. For example, about 40' is required for a U-turn in a sedan.*

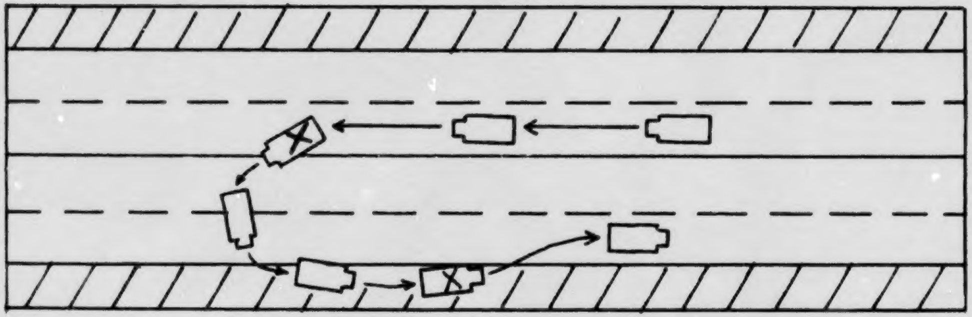
- *Make this point to the trainees:*

    - The fewer traffic lanes crossed, the safer the U-turn.

NOTES

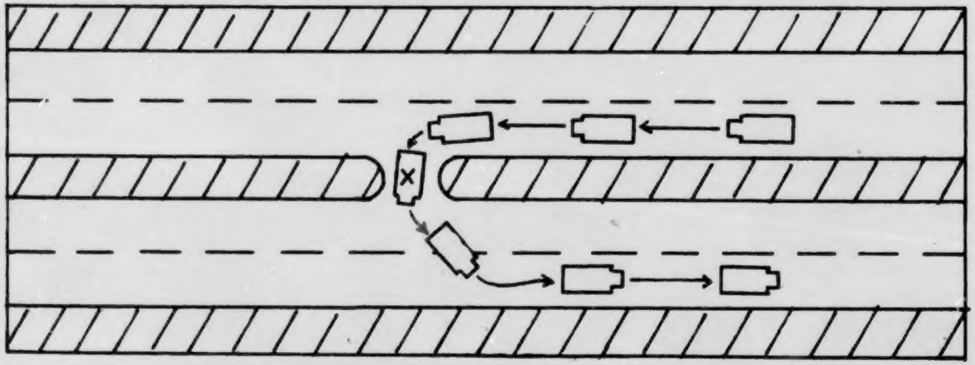
TSG - I-F-24

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES	NOTES
	TSG - I-F-25 PRESENT TRANSPARENCY 12a
 X X X U-TURN USING INTERSECTION CHECK TRAFFIC AT X	PRESENT TRANSPARENCY 12b



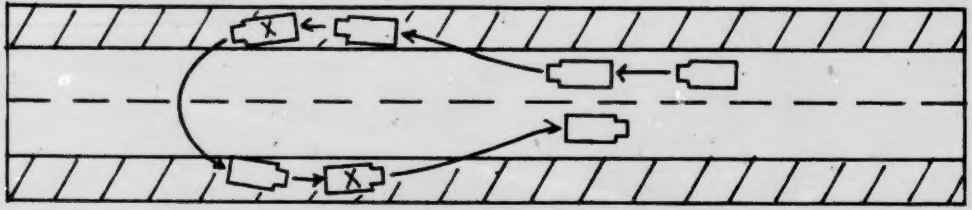
PRESENT TRANSPARENCY 13

CHECK TRAFFIC AT X.



10' MEDIAN —
CHECK TRAFFIC AT X.

(Vehicles with a long wheelbase may need to execute this turn from the outer lane.)



CHECK TRAFFIC AT X.

HEAVY EV'S — WATCH OUT FOR SOFT SHOULDER!

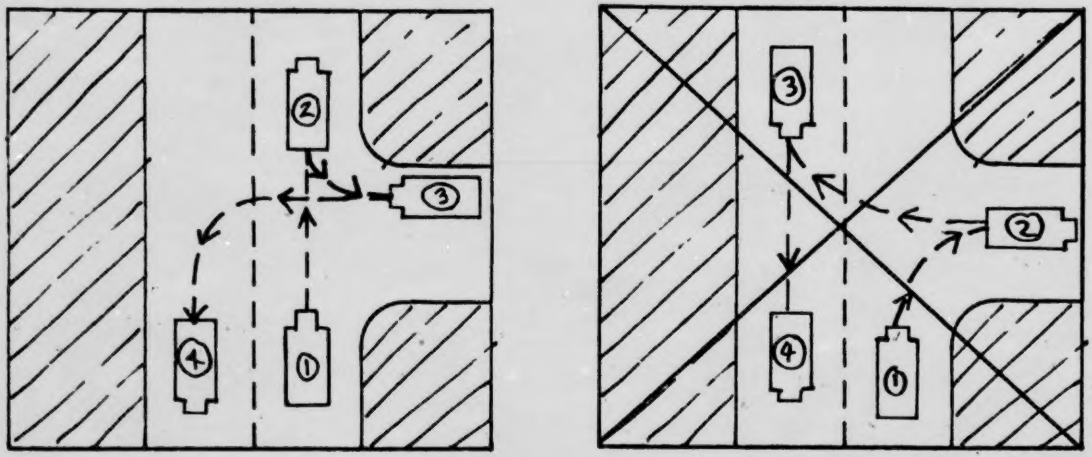
INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES

Two-Point Turnabouts

A. These turns are made when the road is too narrow, or restricted visibility won't permit a U-turn.

- The type of turnabout made depends on whether there is a side road or alley on the right or left side of the road.
- Driveways are private property. Don't use them. (They may not support the weight of larger vehicles.)

B. Right side-road turnabout:



Good Not Good

Right side-road turnabout.

-Ask the trainees why one method is good and one is not good. (Answer: Backing into side-road eliminates necessity for backing across two lanes of traffic.)

NOTES

TSG - I-F-27

PRESENT TRANSPARENCY 14a

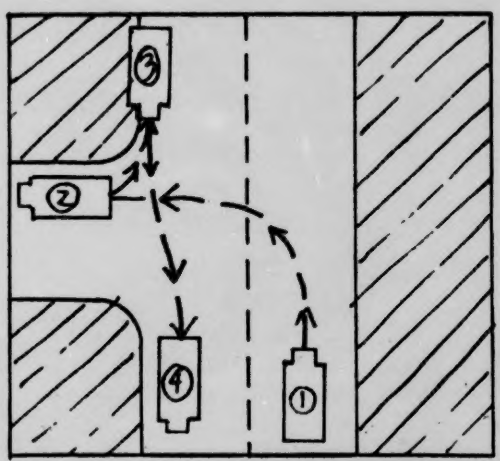
C. Left side-road turnabout:

TSG - I-F-28

- Left side-road turnabout is more hazardous than the right side-road turnabout.

-*Explain turn. Note that at position 3 the EV is partially off the road. This minimizes the hazard of backing into traffic.*

PRESENT TRANSPARENCY 14b



Left side-road turnabout.

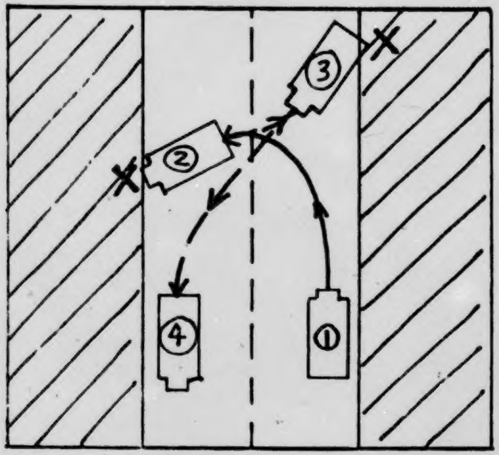
Three-Point Turnabouts

A. These are the most hazardous turnabouts.

B. They should be used only when:

1. The road is too narrow for a U-turn.

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES	NOTES
2. There are no alleys or side roads on either side.	TSG - I-F-28
3. Traffic is light.	
C. Y-turnabout. The front and rear of the EV will extend over the curb during the maneuver.	TSG - I-F-29
•If curb is high, it could damage undercarriage.	
•Big disadvantage is that traffic is crossed three times.	
	PRESENT TRANSPARENCY 15a



Y-turnabout.

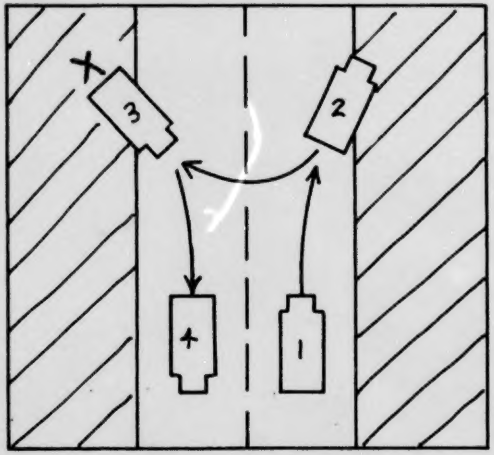
INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES

NOTES

D. Bootleg-turnabout. This is faster than the Y-turnabout, but harder to perform well.

TSG - I-F-29

- The EV only crosses traffic once in a bootleg-turnabout.



Bootleg-turnabout.

PRESENT TRANSPARENCY 15b

Considerations: Turnabouts in the Emergency Mode

TSG - I-F-30

A. In emergency mode, if any exemptions are being exercised (e.g., U-turn where illegal) emergency signaling equipment must be activated.

B. Emergency mode may dictate performing more hazardous types of turnabouts.

- Always use regular turn signaling equipment, as well as emergency signaling equipment.

* * END OF MODULE 5 * *

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES

NOTES

* * * BEGIN MODULE 6 * * *

TSG - I-F-31

FOLLOWING ANOTHER VEHICLE

In 1974, approximately 150,000 disabling injuries and 500 deaths resulted from accidents caused by vehicles that were following too closely.* Three things the operator must learn, to be able to follow at appropriate, safe distances:

A. What is a safe following distance?

B. Techniques to help judge or estimate following distance.

C. When to increase following distance.

What is a Safe Following Distance?

An EV operator is following at a safe distance if he can:

A. Stop without mishap if the vehicle in front comes to a sudden stop, or

B. Take evasive action (steer around) to avoid mishap if the vehicle in front comes to a sudden stop.

-*Tell the trainees that evasive actions will be covered more fully in a later unit (Unit G).*

Estimating Following Distance

-*Ask trainees what information they need to estimate appropriate following distance.*

- How stopping distance relates to vehicle speed (and weight).
- Relationship between stopping distance and following distance.

---

*39

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES	NOTES
•Guidelines to make judgment of the appropriate following distance easier.	TSG - I-F-31
A. What is stopping distance?	
-Write the following equation on the chalkboard:	CHALKBOARD
Reaction Distance + Braking Distance Stopping Distance	
1. Reaction distance is the distance a vehicle travels from the time the driver recognizes the need to stop until brake pedal movement begins.	
a. Average drivers require about 3/4 second to react.	
•Factors influencing reaction time are:	
•Driver alertness (fatigue, drugs, allergies, etc.).	
•Driver capability (vision, performance under stress etc.).	
b. Distance traveled in 3/4 second will be greater as vehicle speed is increased.	TSG - I-F-32
2. Braking distance is the distance traveled from the first brake pedal movement until the vehicle comes to a full stop.	
•There is no "average" braking distance. Braking distance varies greatly according to:	
•Vehicle speed (higher speed--greater braking distance).	

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES | NOTES

- Vehicle weight (heavier vehicles tend to require greater stopping distances).

- Vehicle condition (brakes, tire tread).

- Road surface, both composition (asphalt, concrete, etc.) and condition (icy, rutted, etc.).

TSG - I-F-32

3. Stopping distances for various types of vehicles at various speeds are shown in the chart on the next page.

   a. All stopping distances on the chart assume driver uses 3/4 second to react.

   b. All stopping distances on the chart are based on "hard, dry surfaces."

-Ask the trainees to use the chart to estimate the total stopping distances for each type of vehicle at 70 mph.

TSG - I-F-33

- Sedans--about 530 feet

- Light trucks--about 560 feet

- Heavy 2-axle--about 610 feet

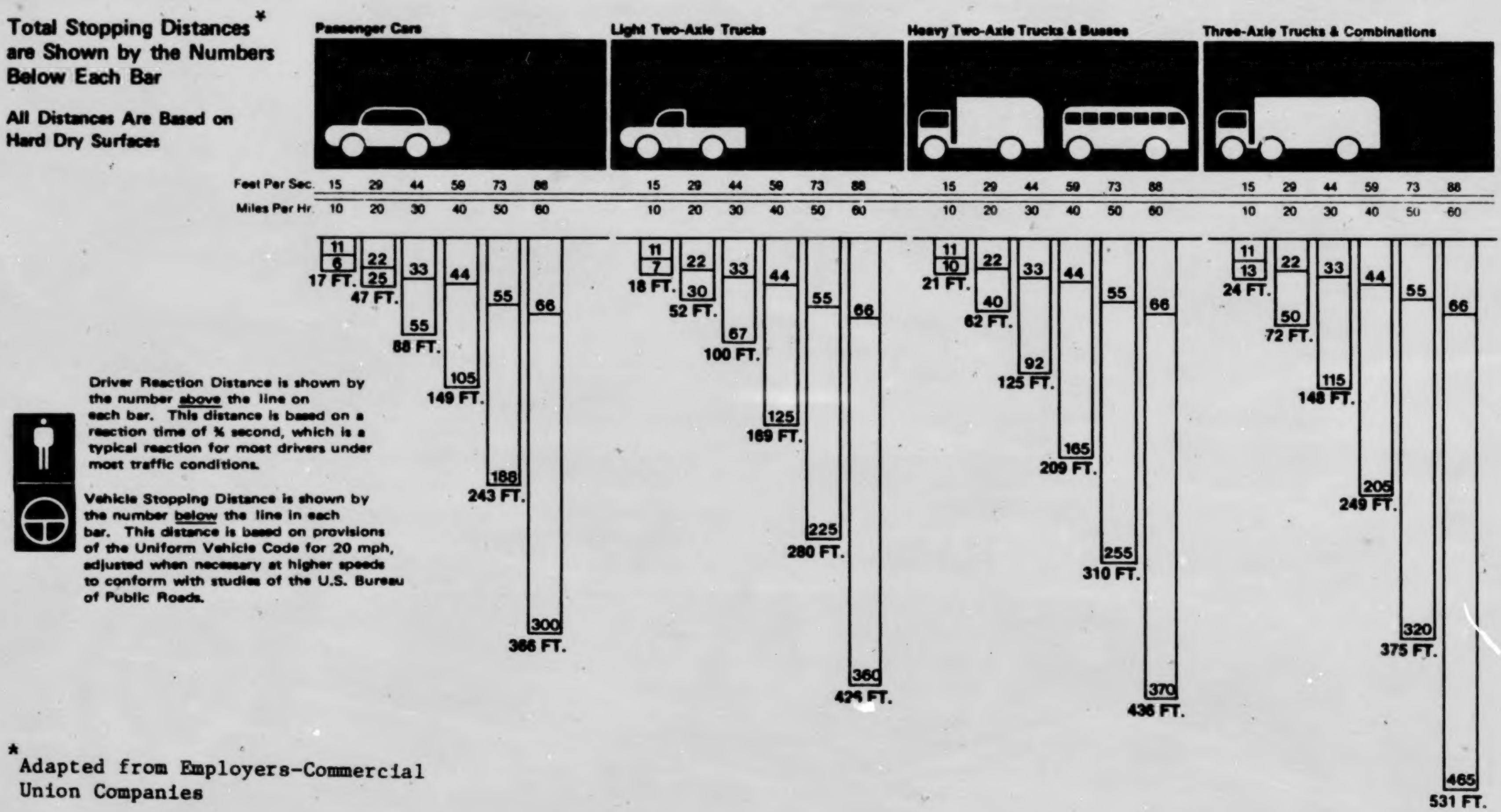
- 3-axle--about 680 feet (more than 1/8 mile)

-Summarize as follows:

- The heavier the vehicle, the longer it will take to stop.

- The higher the speed, the longer it will take to stop.

STOPPING DISTANCES AT VARIOUS HIGHWAY SPEEDS



Total Stopping Distances* are Shown by the Numbers Below Each Bar

All Distances Are Based on Hard Dry Surfaces

Driver Reaction Distance is shown by the number above the line on each bar. This distance is based on a reaction time of ¾ second, which is a typical reaction for most drivers under most traffic conditions.

Vehicle Stopping Distance is shown by the number below the line in each bar. This distance is based on provisions of the Uniform Vehicle Code for 20 mph, adjusted when necessary at higher speeds to conform with studies of the U.S. Bureau of Public Roads.

*Adapted from Employers-Commercial Union Companies

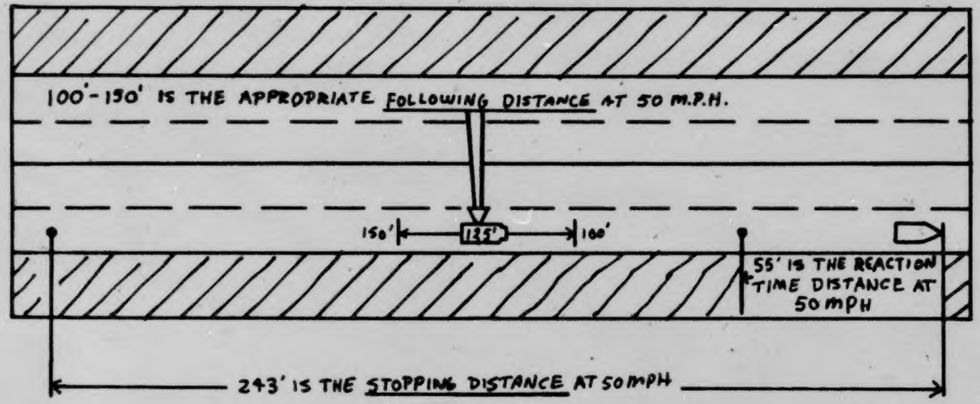
Figure I-8. Stopping Distances at Various Highway Speeds.

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES

B. How to tell when the EV is far enough behind.

1. Following at the full stopping distance (as shown on the chart) is not only unnecessary, it is also impossible!

   •If an EV were traveling that far behind a vehicle in front, other vehicles would constantly pass the EV.


100'-150' IS THE APPROPRIATE FOLLOWING DISTANCE AT 50 M.P.H.
150'
125'
100'
55' IS THE REACTION TIME DISTANCE AT 50 MPH
243' IS THE STOPPING DISTANCE AT 50 MPH

2. An appropriate following distance will allow enough time to come to a complete stop if lead vehicle panic stops (stops as fast as possible by braking).

   •Therefore, safe following distance is greater than the distance required for reaction time, but less than total stopping distance.

-*Write the general rule for calculating following distances (for sedans) on the chalkboard.*

MPH (Vehicle speed)
x 2
Minimum following distance (in feet).

NOTES

TSG - I-F-32

PRESENT TRANSPARENCY 16a

CHALKBOARD

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES

NOTES

3. Two ways to judge following distance:

TSG - I-F-34

-Explain that it is hard to judge when a vehicle is 125' away. It is much easier to approximate the distance in terms of car lengths or in terms of the number of seconds apart the vehicles are.

a. Estimate car lengths--one car length for every 10 mph. A full-sized car is approximately 20 feet long--estimating car lengths provides minimum following distance.

b. Two-second rule--keep a separation of at least two seconds between the EV and the vehicle being followed.

- Three seconds is a lot safer.
- Three seconds recommended for larger vehicles.

-Use the transparency to explain the two-second technique.

PRESENT TRANSPARENCY 16b

- Begin counting (1001, 1002, etc.) when the vehicle in front passes a marker on or beside the road.
- A pole, sign or tree would be a good marker.
- Stop counting when the EV reaches the same marker.

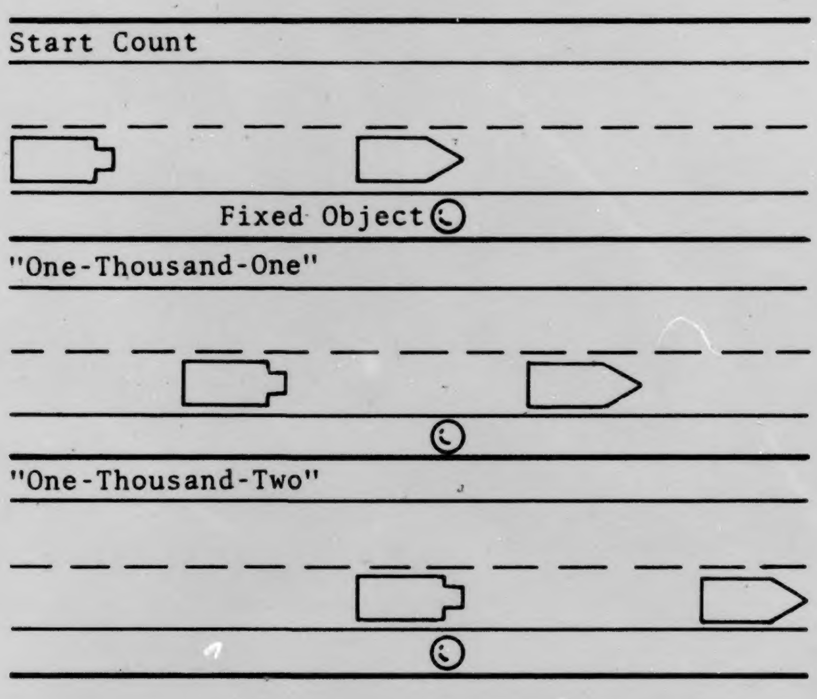
-Explain how using the two-second method will automatically increase the following distance as speed is increased. (Two-second technique is illustrated on the next page.)

-Discuss the merits of each method of judging following distance; be sure to provide the following information:

- Car length method--focus of eyes stays constant, but proper estimates are difficult for many people.

- Two-second method--once learned, allows more precise estimates of adequate following distance, but the need to shift the focus of eyes can reduce operator's ability to detect hazards.

- It is a good idea for every operator to try both methods and select the one that works best for him. The two methods can be "checked" against each other to get a feel for appropriate following distance.


Start Count
Fixed Object
"One-Thousand-One"
"One-Thousand-Two"

TSG - I-F-34

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES	NOTES
When Should Following Distance Be Increased?	TSG - I-F-35

When Should Following Distance Be Increased?

A. Increase following distance by 50 percent: if vehicle ahead is unusual, EV is large and/or heavy, EV is not adequately maintained.

- Fire apparatus would safely use a three-second rule or one apparatus length for every 10 mph.

B. Double following distance: if road surface is loose or slippery (wet, dirt, gravel) vision is obscured (rain, fog, dust, smog) or driver is not fully alert.

C. Triple following distance: if road surface is packed snow or icy.

Practice

-Select two trainees and give some time to answer each of the following questions. Make sure the answers that appear below are covered. Encourage class participation and discussion.

A. A police officer is driving to the station at the end of a shift. He is very tired and the road is covered with hard snow. By how much should he increase his following distance?

- The fact that the officer is tired, and perhaps not fully alert, would indicate that following distance should be doubled. Since the road is covered with snow, however, following distance should be tripled.

B. A large fire apparatus (elevated platform) is being driven on a high-speed expressway. The operator is taking the apparatus to the city garage for service; some difficulties in the vehicle's braking system have been observed. By how much should the driver increase following distance?

TSG - I-F-35

- In this instance, since the vehicle is a large, heavy apparatus, normal following distance would be 3 seconds or 1 apparatus length for every 10 mph. Since the vehicle is not in good condition, following distance should be increased by 50 percent (to approximately 5 seconds or 1-1/2 apparatus lengths for each 10 mph).

Considerations: Following Distance in the Emergency Mode

TSG - I-F-36

A. In spite of the stress and urgency of an emergency run, the laws of physics do not change. It still takes 243 feet to stop a sedan from 50 mph and longer for larger vehicles!

B. Should following distance be decreased when traveling in the emergency mode?

-Discuss the following points. The key realization the trainees should reach is that they don't gain anything by reducing following distance in the emergency mode.

- Many operators' reactions and performance get worse under stress. Each operator must learn his own individual capability to respond to stress.

- Motorists may react in crazy ways to lights and sirens. If they stop or slow drastically, the EV operator needs the full amount of following distance to respond.

- A greater following distance permits the EV operator to get the "big picture" of the traffic situation.

* * END OF MODULE 6 * *

PASSING ANOTHER VEHICLE

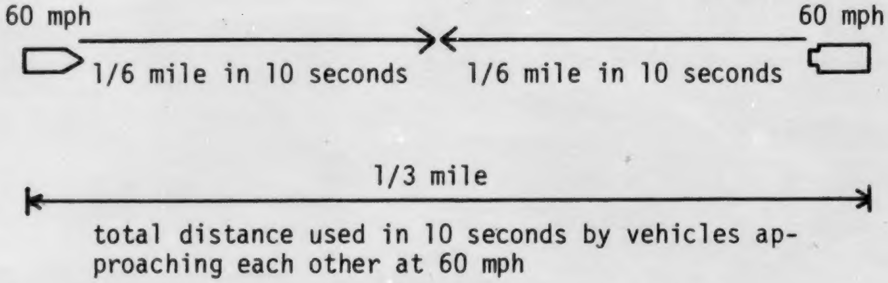
How Long Does It Take to Pass?

A. At highway speeds (40 to 60 mph) in a sedan, a safe pass can be completed in 10 seconds.

-Explain how passing time varies for different types of vehicles because of the variation in vehicle's accelerative capabilities.

1. Figures assume the EV's starting speed is approximately the same as that of the vehicle to be passed.
2. Figures allow a complete pass (including smooth return to the right lane).

B. In terms of distance, a 10-second pass requires 1/6 mile at 60 mph. Due to the possibility of an oncoming vehicle, operator must allow 1/3 mile of visible roadway before initiating a pass.


60 mph
1/6 mile in 10 seconds
60 mph
1/6 mile in 10 seconds
1/3 mile
total distance used in 10 seconds by vehicles approaching each other at 60 mph

* * * BEGIN MODULE 7 * * *

TSG - I-F-37

-Explain how the EV on the right needs a clear path of nearly 1/3 mile for a safe pass.

TSG - I-F-37

-Present in general terms, the passing distance and visible roadway distance requirements for various speeds.

CHALKBOARD

Starting Speed	Passing Distance	Visible Roadway
30 mph	450 ft.	900 ft.
35 mph	525 ft.	1,050 ft.(1/5 mile)
45 mph	675 ft.	1,350 ft.
55 mph	825 ft.	1,650 ft.
60 mph	900 ft.	1,800 ft.(1/3 mile)

-Tell the trainees:

- Some drivers have trouble building a "mental picture" of distances.
- One way to learn to perceive these distances is to make a mental note of vehicle size and road convergence at expressway exit points when the signs indicate the mileage to the exit.
- 1/10 mile markers are also useful in learning to judge distances.

Considerations Before Passing

TSG - I-F-38

-Before beginning discussion of this topic, list on the chalkboard, the three items to be considered before passing.

CHALKBOARD

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES

- Vehicle Characterists.
- Road Information.
- Traffic Situation.

A. Vehicle Characteristics: Operator should be familiar with specific vehicle. If operator drives different vehicles daily, he must check out and familiarize himself with the specific handling characteristics of each vehicle.

- Familiarity with a vehicle can be enhanced by a thorough inspection every day.

1. Accelerative capacity?
2. Steering precision?
3. Braking capability?
   - Braking capability can become tremendously important should the operator unexpectedly have to abort a pass.

B. Road Information: Critical to successful passing. Kind of information to look for:

1. Informational signs: "No Passing," "Intersection Ahead," etc.
2. Road markings: solid center-line, broken center-line, etc.
3. Road configuration: hills, blind curves in intended passing area, intersecting roads, etc.

NOTES

TSG - I-F-38

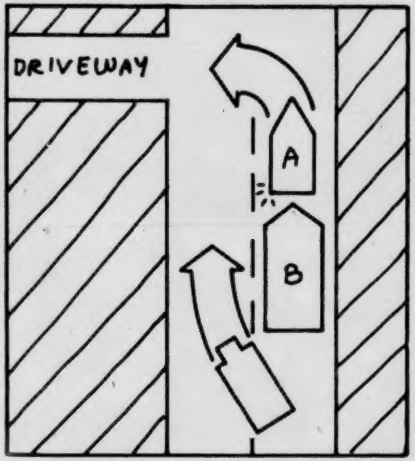
INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES

-Emphasize the following points:

- Many road markings and signs forbid passing for no apparent reason. Usually, however, there is a good reason: hidden driveway, school, damaged road surface, poor road design, etc.

- One good way for an EV operator to become a safer driver is to become familiar with his area. It is especially important to be alert for new road markings and signs.

- A pass should never be attempted on a stretch of road where there are intersecting roads, even driveways.



-Make these points about the above illustration.

- Never pass stopped car (or line of cars) without first determining why it is stopped.

NOTES

TSG - I-F-38

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES | **NOTES**

- The EV did not take the time to determine why the truck (B) was stopped. Had he done so, he never would have attempted to pass.

TSG - I-F-38

- If the operator were very familiar with the area, he might have known why the truck was stopped.

C. Traffic Situation:

TSG - I-F-39

1. Speed of traffic flow.

   a. Passing a vehicle that is traveling at the maximum posted limit is ILLEGAL unless EV is in emergency mode.

   b. On two- and three-lane roads, when traffic flow is heavy but moving at a constant speed, there is little to gain by passing.

2. Distance of oncoming traffic. How much of the oncoming lane of traffic is visible?

-Tell the trainees the following kinds of things can limit visibility:

- Blind curves.
- Hillcrests.
- Bad weather (fog, heavy rain, etc.).

-Emphasize the following points:

- Never pull abreast of another vehicle unless you are sure the pass can be completed safely.
- On two and three-lane roads, never pass stopped traffic unless certain there is space ahead to return to right lane.

- When deciding to pass a larger vehicle, it is sometimes necessary to pull slightly left (straddle the lane) in order to determine the traffic situation ahead.

TSG - I-F-39

Executing a Passing Maneuver

This maneuver assumes starting from a safe following distance.

A. Check traffic--mirrors, blind spot.

B. Signal before lane change.

C. Accelerate while changing lanes.

D. Signal before returning to right lane.

E. Return to right lane when all of passed vehicle is visible in rear-view mirror.

F. Cancel directional signal, resume cruising speed.

TSG - I-F-40

Being Passed

EVs are passed less often than other vehicles. When being passed certain courtesies should be extended:

A. Do not change speed while being passed.

- Operator should keep constantly aware of the position of surrounding vehicles.
- Often drivers speed up (unintentionally) as the passing vehicle speeds up.

B. If the passing driver gets into a dangerous situation, try to assist.

- Pull as far to the right as possible.
- Accelerate or decelerate as necessary.

TSG - I-F-40

Tips for Avoiding Mishaps When Passing

A. If decision has been made to pass, and conditions are okay, DON'T HESITATE--conditions could worsen.

B. Stay in passing lane shortest time possible.

C. Constantly scan roadway for unmarked, intersecting roads.

- In many states it is illegal to pass if the pass will be in process when a side-road intersects from the left.
- Whether or not it is illegal, it is dangerous!

D. Be prepared to abort if conditions worsen:

- Most vehicles can slow up much more quickly than they can accelerate.
- Unless fully abreast of another vehicle, it is often safer to pull behind than to try to accelerate.

Considerations: Passing in the Emergency Mode

A. Since motorists will attempt to pull over, the need to pass may be reduced.

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES	**NOTES**
B. Evaluation of risk vs. gain.	TSG - I-F-40
1. Many passing situations are potentially hazardous, involving some risk. In the emergency mode, the gain (e.g., save a life) may justify increased risk.	TSG - I-F-41

2. When conditions are ideal, very little risk.

- Ideal conditions:
  - Vehicle in good shape.
  - Road information okay.
  - Traffic situation light (or okay for pass).

3. When one or more conditions are questionable, risk increases.

-Ask the trainees the following questions and discuss.

a. How important is saving time?

- Out-of-control fire in apartment building vs. brush fire in an isolated field?
- Armed robbery in progress vs. day-old vandalism?
- Childbirth with complications vs. epileptic seizure?

b. How much time will really be saved by passing? (How much faster will the EV be able to travel after the pass?)

c. If passing is delayed for a few moments, might conditions improve?

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES

NOTES

- Lane markings change.
- Traffic thins out.
- Road configuration improves (e.g., from curves to straight).

TSG - I-F-41

C. It may be necessary to execute a "running pass."

-Explain how a "running pass" works.

- Delay pulling into left lane.
- Build up speed in the right lane; activate turn signal.
- Pull out and pass at a higher rate of speed.
- Complete pass normally.

-Have trainees determine advantages and disadvantages.

- Advantages: Time in left (oncoming traffic) lane is reduced.
- Disadvantages: If EV operator decides not to pass, EV will be following too closely--a dangerous situation until rectified.

* * END OF MODULE 7 * *

EXPRESSWAY OPERATION

A. The term expressway as used here includes interstates, freeways, turnpikes, or any other type of limited-access multilane highway.

B. Much of expressway operation is routine, requiring little or no decision making.

- Driving on long stretches of flat, straight road often requires the operator to make a special effort to stay alert.

C. Entering and exiting expressways are maneuvers that place a big demand on the operator to make fast, accurate decisions in rapid succession.

D. Driving at the speed limit requires constant awareness of the road and traffic environment.

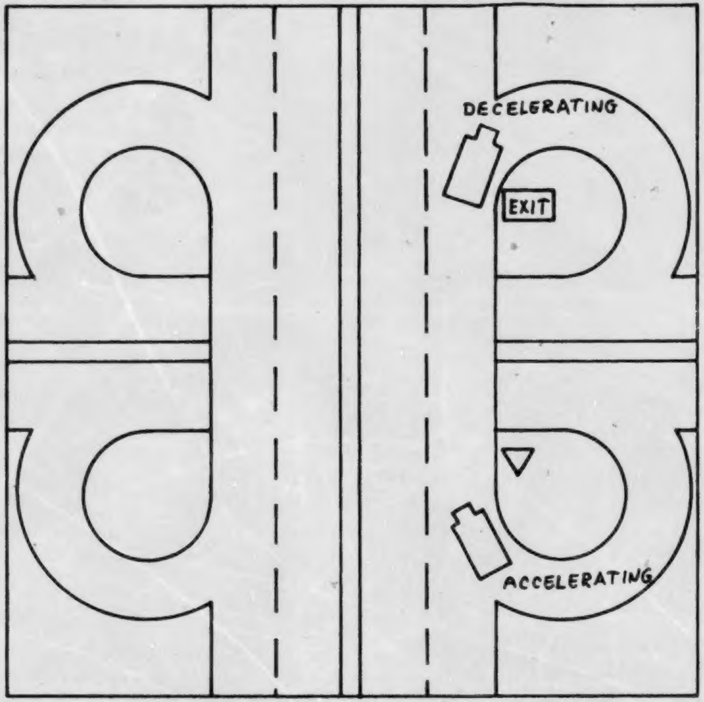
Entering and Exiting Expressways

A. Cloverleaf intersections can be one of the biggest problems when entering or exiting expressways (see illustration on the next page).

- One group of cars is slowing to exit while another group is accelerating to enter.
- The two groups must cross in the right-most lane.

* * * BEGIN MODULE 8 * * *

TSG - I-F-42



B. Entering an expressway.

1. When on the entry ramp, stay well behind the vehicle ahead. Be prepared to stop should the vehicle in front come to a sudden stop due to traffic conditions.

2. While on the ramp, activate left-turn signal.

3. Before entering traffic, watch the traffic for a gap that is large enough to permit entry.

TSG - I-F-43

PRESENT TRANSPARENCY 17

- Car ahead may stop while EV operator is looking back.

4. Adjust speed for merging into the selected gap.

- Try to avoid coming to a complete stop, if possible.

- Adjusting speed, even slowing greatly, is much safer.

-*Explain that if there is no acceleration lane, or if the acceleration lane is very short, a "Yield" sign will probably be at the point where the ramp joins the road.*

5. Yield signs.

-*Ask one of the trainees to explain what a "Yield" sign means. Be sure all trainees are clear on the correct definition.*

- A Yield sign requires the right-of-way to be given (come to a full stop, if necessary) to any traffic that is close enough to be a hazard.

- The Yield sign does not necessarily require a full stop--often slowing down will be sufficient to allow any traffic which could be a hazard to pass.

- A Yield sign at an expressway entrance should cue the operator to the following:
    - The expressway probably has a short acceleration lane or no acceleration lane.
    - The driver behind the EV may not be alert to the fact that the EV may come to a complete stop.

-*Ask the trainees what can be done to avoid being rear-ended.*

TSG - I-F-44

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES

NOTES

- Check rear-view mirror frequently.

TSG - I-F-44

- Brake gradually to allow following driver as much time as possible to slow.
- Pump brakes so brake lights flash on and off.

C. Exiting an expressway. It is important to position the EV in the correct lane well in advance of the exit.

1. If lanes must be changed to position the EV for the exit ramp, move over one lane at a time, making sure to signal each time.
2. If the same traffic lane is used for both deceleration and acceleration, the operator may have to slow or accelerate quickly to get through and onto the exit ramp.
3. Once in the deceleration lane or exit lane, signal intention to exit.
4. Begin decelerating.
5. Once on the ramp, make sure speed does not exceed the recommended speed.
    - Because they are often curved and narrow, the speed on exit ramps will generally be 20 to 30 mph below highway speed.
    - Check speedometer. After traveling at high speed, drivers often think they are going much slower than they really are.

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES	NOTES
D. Review of entry/exit considerations.	TSG - I-F-44
-Discuss each key point on transparency 18 (Figure I-9).	TSG - I-F-45
•Transparency 18 (Figure I-9):	PRESENT TRANSPARENCY 18
•Signal intentions in advance, for entry and exit.	
•Accelerate or decelerate in proper lane.	
•Watch speed on exit ramps:	
•Many exit ramps are tight or changing radius curves. OBSERVE CAUTIONARY RAMP SPEEDS.	
•Check speedometer; after traveling at highway speeds, it is difficult to judge slow speeds.	
-Discuss the situation illustrated on page I-F-72.	TSG - I-F-46

ENTERING AND EXITING FREEWAYS

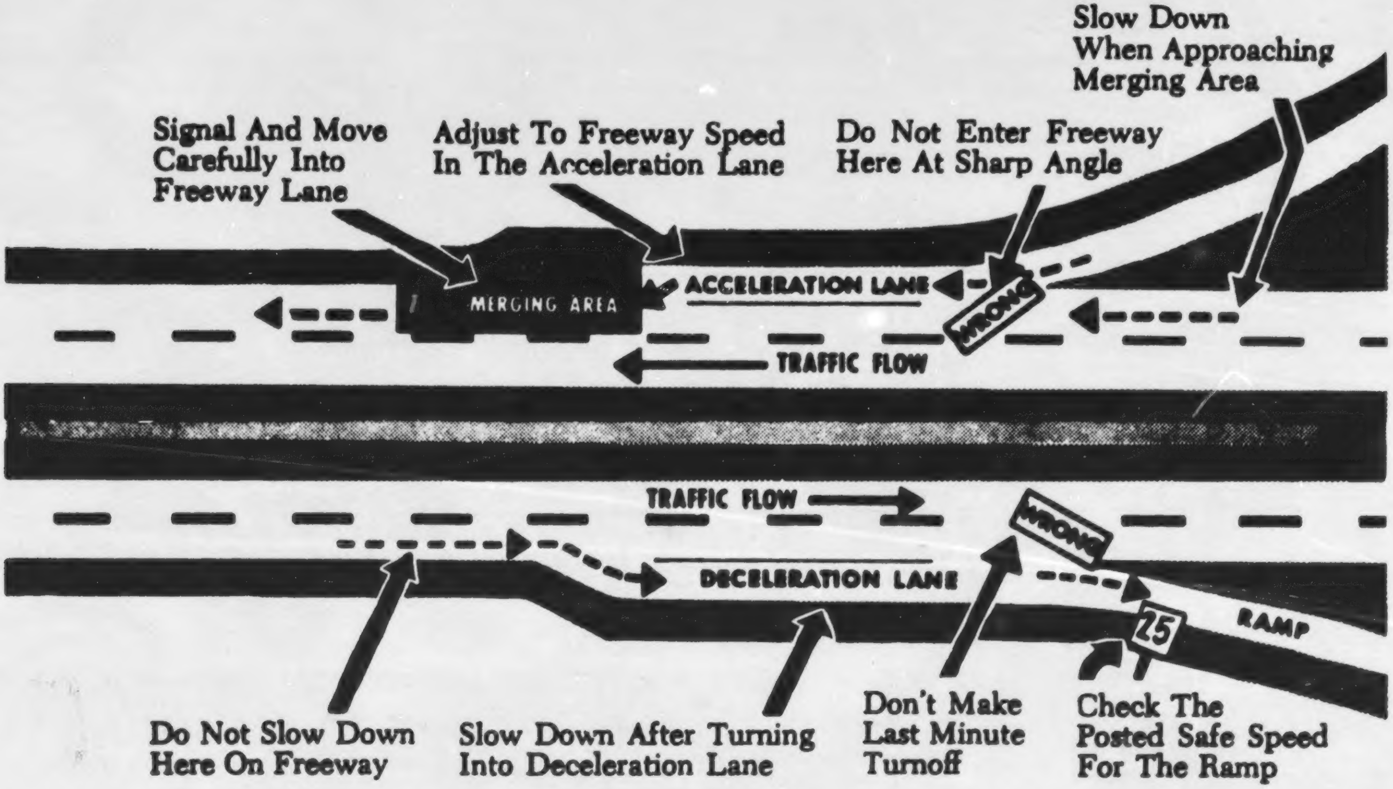

Slow Down When Approaching Merging Area
Signal And Move Carefully Into Freeway Lane
Adjust To Freeway Speed In The Acceleration Lane
Do Not Enter Freeway Here At Sharp Angle
MERGING AREA
ACCELERATION LANE
WRONG
TRAFFIC FLOW
TRAFFIC FLOW
WRONG
DECELERATION LANE
25
RAMP
Do Not Slow Down Here On Freeway
Slow Down After Turning Into Deceleration Lane
Don't Make Last Minute Turnoff
Check The Posted Safe Speed For The Ramp

Figure I-9. Entering and Exiting Freeways.

DISCUSSION QUESTIONS

You are driving the EV marked "U." You want to leave the expressway at this exit.

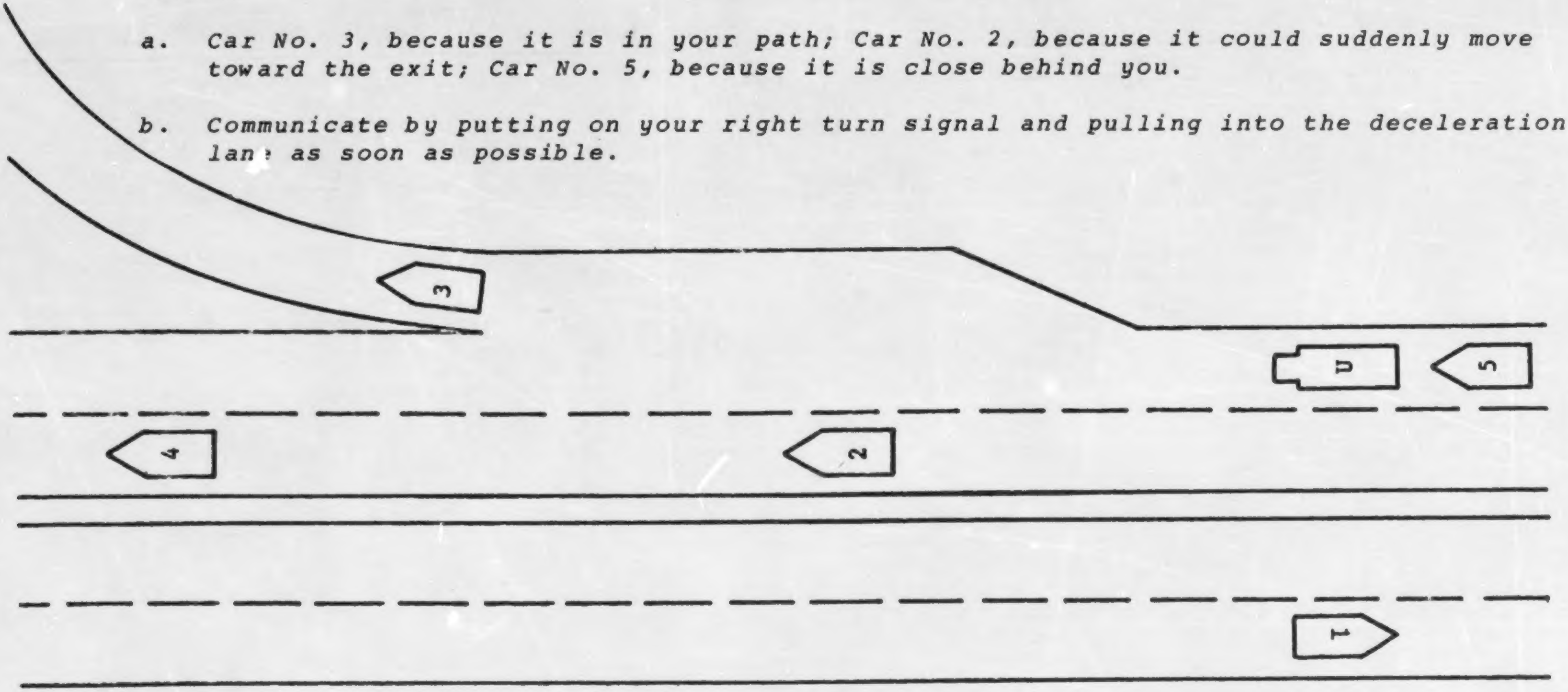
a. Circle the main things you should be observing.

b. How would you communicate that you want to leave the expressway?

Answer:

a. Car No. 3, because it is in your path; Car No. 2, because it could suddenly move toward the exit; Car No. 5, because it is close behind you.

b. Communicate by putting on your right turn signal and pulling into the deceleration lane as soon as possible.



INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES	NOTES
Driving at the Limit on Expressways	TSG - I-F-47

Driving at the Limit on Expressways

- *Give the trainees a few minutes to read over the tips for driving defensively (A-E). Then go over each point and encourage discussion. Be sure to emphasize the importance of maintaining at least a two-second following distance on expressways.*

Many of the high-speed roads in America have been so well designed and built that it is safer to travel at high speed on these roads, than at low speed on less modern roads. Some hints for safer driving:

A. Look far ahead. Keep in mind that stopping distance at 55 mph is over 300 feet (for sedans).

   1. Operator should learn to spot potential trouble as early as possible.

   2. Look beyond the car in front.

   3. Watch for brake lights or a puff of dust or any other sign of trouble ahead.

   4. The earlier the EV operator can begin to react to trouble, the more likely it is that trouble can be avoided.

B. Match EV's speed to the cars around. Don't go over the limit, but don't go too slow either. Both can be dangerous.

C. Get away from the "pack." When a cluster of cars goes down the highway together, each driver depends on all of the others to drive carefully. Defensive driving means assuming the worst about the others on the road, and being ready for anything. If a cluster of cars is ahead, stay behind until it breaks up. If a cluster of cars comes up from behind, slow down enough to let them go by.

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES	NOTES
D. Use mirrors every few seconds. The EV operator needs to be aware of all vehicles surrounding the EV.	TSG - I-F-47
E. Signal lane changes well in advance. Change lanes only when sure the other lane is clear. Remember, turn signals do not grant the right to move over. Some drivers act as if they did.	TSG - I-F-48

Considerations: Expressway Operation in the Emergency Mode

A. Use of lights and siren.

1. Avoid use of emergency signaling equipment on entrance ramps.

   - Motorists will become confused. Should they move right--into the EV's entrance lane?

   a. Make a normal entry.

   b. Assess traffic-flow conditions and choose lane for emergency run or high-speed operation before activating lights and siren.

2. Avoid weaving from lane to lane with lights and siren on.

   - Again, motorists can become confused. They will tend to pull right; perhaps into the EV's path.

3. Motorists may be unaware that EV is in emergency mode if:

   a. EV is traveling fast (EV may be driving "ahead of siren").

   b. There is low sun or glare (may obliterate lights).

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES	**NOTES**
B. Beltway: A continuous-loop freeway or expressway, generally surrounding a large, metropolitan area.	TSG - I-F-48
•Embarassingly, EV operators often go the wrong way on beltway. •Beltways are often identified as inner/outer loop. •Clear communications with dispatcher required! 1. Determine proper entrance to use.	
2. Determine if destination is East or West (North or South) of a given exit. 3. If accident, in East or Westbound (North or Southbound) traffic flow? •What are the local conventions for designating direction on beltways? (e.g., When does West change to North?) C. Local expressways. *-Discuss local expressway configurations.* •Are there any local names used for expressways (e.g., "Parkway West")? Are the names misleading? (Does "Parkway West" refer to a direction on the expressway or to a section of the expressway?) •Are there any limited entrance/exit points (e.g., interchanges where EV operator could not get on and off in both directions)? •Are there places where turnabout can be made? •What are the best exits for emergency facilities (e.g., hospitals)? •Are there rush hour pecularities (e.g., bottlenecks, changes in lane usage)?	TSG - I-F-49 * * END OF MODULE 8 * *

* * * BEGIN MODULE 9 * * *

DRIVING AT HIGH SPEED

TSG - I-F-50

The coverage in this, the final module in the Operation Unit, is keyed to operation of the EV in the emergency mode at speeds in excess of the limit. The techniques presented are useful at any speed, however. In fact, they can (and should) be practiced at slower speeds (during low-traffic times) as part of an on-going program for developing the necessary skill for applying them at high speed.

Introduction

A. Some emergencies may require high-speed EV operation.

-*This is greatly dependent on local policy. The following, however, should be noted for the trainees:*

- An ambulance or rescue vehicle with a stabilized patient aboard should NEVER travel over the posted limit.
- Large, heavy fire apparatus are especially difficult to control at high speed. Thus, operation at speeds over the posted limit requires a high degree of skill and sound judgment.

B. This module provides knowledge and techniques needed for:

1. Driving on curved and winding roads at the highest possible safe speed.
2. Slowing down from high speed.

C. The primary rules are:

-*Write the rules on the chalkboard. Circle "know" in rule 1.*

1. Don't try to negotiate a curve faster than you know you can. Observe posted speed limits and allow for conditions which make lower speeds necessary, i.e. wet pavement, ice, etc.

CHALKBOARD

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES | **NOTES**

2. Avoid brake fade.

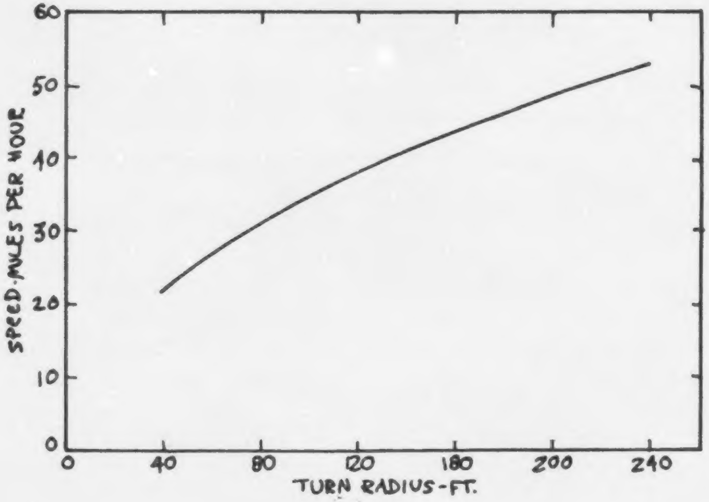
TSG - I-F-50

Curves and Limits Imposed by the Laws of Physics

A. In turns, centrifugal force quadruples as speed doubles. When the centrifugal force is high enough (0.8g) vehicle cannot follow curve on the intended track.

B. For any curve, there is a maximum speed for traveling through the curve successfully.

TSG - I-F-51



PRESENT TRANSPARENCY 19a

-If trainees will be driving EVs with a high center of gravity (anything other than a sedan or station wagon) indicate that the line on the chart does not apply to those vehicles. A correct line for those vehicles would be somewhat below (depending on the specific vehicle) but parallel to the existing line.

C. The tighter the curve, the slower the EV must go.

D. It is operator's job to control speed. If speed in a curve is too great, physics will win!

-Ask the trainees:

- How fast can a sedan go around a curve 120 feet in radius? (Answer: about 40 mph.)
- How fast around a city intersection with an effective radius of 50 feet? (Answer: about 24 mph.)

Curves in the Local Area

A. Gain familiarity with all road conditions and layouts in the area. EV operators should look for:

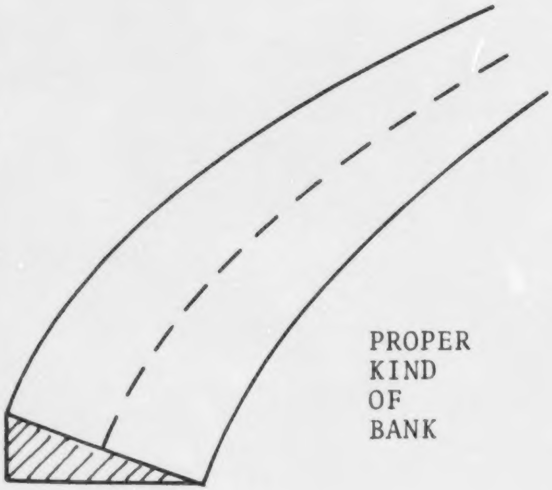
1. Bank of the curve.
    - The road should slant down toward the inside of the curve.
    - Some older roads are banked the opposite way.

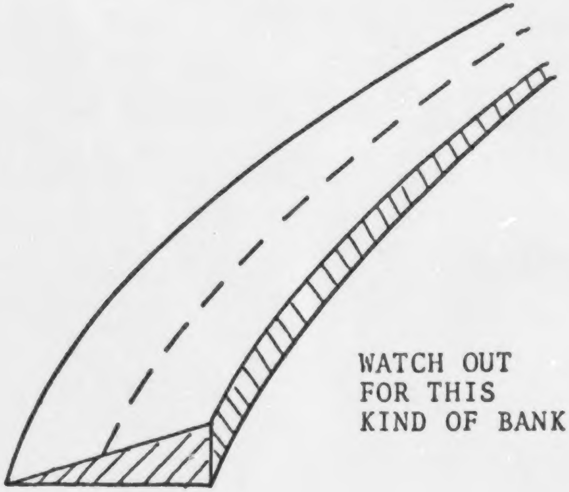
-Explain to trainees the problems with roads having a high crown.

-Relate the bank of the curve to the effects of centrifugal force.

TSG - I-F-51

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES


PROPER
KIND
OF
BANK


WATCH OUT
FOR THIS
KIND OF BANK

2. Road surface.

- Narrower?
- Ruts, cracks?
- Non-solid edges?
- Change in surface material (e.g., concrete to blacktop)?
- Vehicles don't have nearly as much traction on blacktop as they have on concrete.
- Bumpy roads reduce the amount of time tires are in contact with the road surface.

NOTES

TSG - I-F-52

PRESENT TRANSPARENCY 19b

3. Curves leading to potentially dangerous situations:

TSG - I-F-52

- Curves that crest hills.
- Curves that lead to intersections.
- Curves that lead to population pockets (towns, schools, factories, etc.).

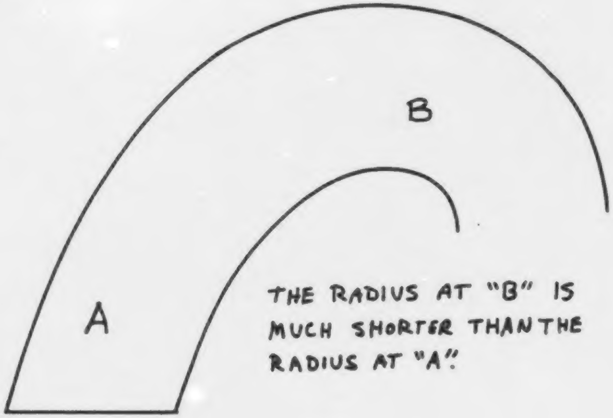
4. Curves having a decreasing radius.

- Because of land availability or restrictions, highway designers often lay out curves in a decreasing radius pattern.
- Such turns start out with a relatively large radius which tightens as the vehicle penetrates the curve.

-Ask the trainees where they might commonly expect to find decreasing-radius curves. (Answer: entry and exit ramps on expressways and on older roads.)

PRESENT TRANSPARENCY 19c

TSG - I-F-53



INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES	NOTES
a. On decreasing-radius curves, the maximum entry speed is too fast for the later (tighter) portion of the curve.	TSG - I-F-53

a. On decreasing-radius curves, the maximum entry speed is too fast for the later (tighter) portion of the curve.

- If speed is too high for the tighter portion of the curve, physics will win, and vehicle control will be impossible.

- Decreasing-radius curves can sometimes be identified by the series of black, greasy tire tracks at that point in the curve where other vehicles have left the desired track in panic brake lockups.

b. When approaching a decreasing-radius curve, operator should select an appropriate entry speed for the entire curve.

- You can't select an appropriate speed, unless you know the road configuration in advance. Know the area!

B. The EV operator must know about the road, in advance, if he hopes to be able to negotiate any curve at highest possible safe speed.

- Good idea to practice negotiating curves in the area during early morning (or other low traffic) hours.

- The techniques outlined on the next several pages can be applied at moderate speeds at first, until the dynamics described are fully understood.

-Explain to trainees that the practical exercises that will be presented in Part III are designed to provide the first level of practice.

Techniques for Negotiating Curves at High Speed

TSG - I-F-53

The entire curve must be considered. Following are the three points which are critical when negotiating curves:

1. Proper speed and vehicle position for entry to curve.
2. Maintaining speed in curve.
3. Proper speed and vehicle position for exit from the curve.

A. Entry.

TSG - I-F-54

1. Brake or decelerate to the proper entry speed before entering the curve.
    - Proper speed is different for every curve.
    - For any curve, the entry speed can be increased somewhat by entering the curve on the "high" or outside of the curve.
2. Enter the curve as far to the outside as possible.
    - Entering on the outside of the curve effectively increases the radius of the track for the EV. The greater the radius, the faster the turn can be safely negotiated.
3. Begin turn as early as possible.
    - Inexperienced drivers invariably go "too deep" into curve before starting to corner vehicle.
4. Establish an apex (when beginning the turn) at last part of inside road edge (or center line) that can be seen from the entry point.

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES | **NOTES**

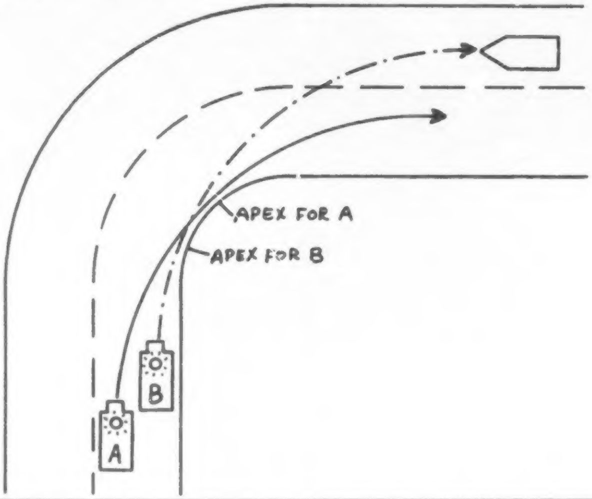
TSG - I-F-54

- The apex is the point on the inside of curve where vehicle comes closest to road edge or center line.
- Generally, the further along the curve the apex is, the better.

-Be sure trainees understand illustration. Key points:

- The assumed speed and the radius of vehicle track for both A and B are identical.
- A has started entry:
  - Early.
  - On the high (out) side.
- Apex for A is further along the curve than apex for B.
- B is going to have a serious accident.

PRESENT TRANSPARENCY 20



B. In the curve.

1. If the maximum safe speed for a curve has been attained, the EV will feel "comfortable." Experienced drivers say such vehicles are "in the groove." This feeling can only be learned by experience. Trainees will begin to develop this feeling in Part III of the course.

   - The maximum "safe" speed for traveling any curve is not the maximum "possible" speed.
   - At the maximum possible speed, the "feeling" will not be comfortable. It will feel as though the suspension is straining.
   - The maximum possible speed is not safe. At that speed vehicle control becomes so critical that a relatively small event (e.g., some sand or gravel on the road) can cause complete loss of control.

2. EV should be in the groove by the time the apex is reached.

   - The EV's suspension is set for cornering in a constant radius turn.
   - The EV is close to the inside edge of the curve.

-*Ask the trainees how they will know if they are going too fast and have missed the groove.*

   - Vehicle will be close to spinning out (again, detecting that point can only be learned with practice).

-*Ask the trainees what you do if you miss the groove.*

   - STAY OFF the accelerator and brake.

TSG - I-F-55

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES

NOTES

TSG - I-F-55

- Scrubbing action of tires will slow vehicle.
- EV will have room to drift from inside to outside of curve.

3. Once in the groove, apply slight power in curve to maintain speed:

   - Scrubbing action of tires will slow EV unless power is applied.
   - Apply power carefully. Too much power can (1) result in loss of steering control or (2) cause rear wheels to spin and loose rear-end traction.

4. Never try to gain speed beyond the established maximum safe speed for the curve.

   - For most combinations of vehicle characteristics, road conditions, radius of curves, and speed, an increase of just 3 mph over the safe speed will cause complete loss of control.

C. Exit.

1. To another curve.

   a. Keep it slow and steady.

   b. Drift to farthest (outside) portion of lane.

   c. Adjust speed for next curve.

      - If the radius for the next part of the curve is tighter (shorter than the radius being traveled by the vehicle, operator must slow down before tightening the EV's turning radius.

- If possible, let scrubbing action of tires do slowing down. Avoid hard braking if at all possible.

TSG - I-F-55

d. Establish an apex for the next curve.

2. To a straight.

a. Establish the widest (outside) position and the latest possible apex.

TSG - I-F-56

b. Accelerate out of the curve after the apex has been reached.

- Proper exit from a curve to a straight is where good drivers gain time.

Slowing From High Speed

A. Braking distance increases dramatically with increased speed. When speed is doubled, braking distance more then quadruples.

-*The purpose of this chart is not to have trainees learn these distances. It is to show the relationship between speed and stopping distances.*

Stopping Distance at High Speed

Speed in mph	Distance in feet (Good brakes, dry concrete, sedan)
40	149
50	243
60	366
70	497
80	708

B. Techniques for stopping from high speed.

TSG - I-F-56

- Point out that brakes, being mechanical devices, should not be abused.

- Laws of physics, particularly generation of heat in reducing speed, are operating on them.
- Overdo it and the physics will make EV's brakes useless.
- Be particularly cautious of long down-hill grades. It is far better to use a lower gear to hold speed down than to risk brake fade.

1. Proper high-speed braking technique depends on the kind of brakes the EV has. For either disc or drum brakes, it is not advisable to lock up the wheels.
   - Stopping distance may be increased with locked wheels. Directional control will be lost. (Remember the little beads of rubber that act like ball bearings.)

- Discuss: Some drivers advocate locking the wheels if directional control is not critical. Their argument is that most drivers are not skilled enough to reach the optimum braking point short of locking the wheels.

2. Use the right foot for braking. When a stop is imminent, "cover" the brake with right foot. Don't risk brake fade by riding the brake.

TSG - I-F-57

- Emphasize that this is a controversial point. Left-foot braking is fractionally faster, but right-foot braking eliminates the chance of inadvertantly jamming on the accelerator during a panic stop, and reduces the likelihood of brake fade.

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES

3. If EV has disc brakes, to stop as fast as possible:

   a. Always use a smooth braking motion.

   b. Apply maximum pressure short of locking the wheels.

   c. Keep the pressure on until the EV has slowed to the desired speed.

   - Even with good disc brakes, excessive braking in this fashion can lead to brake fade. If pedal pressure must be increased to maintain constant rate of deceleration, brake fade may be occurring. EV operator should switch to the technique used for drum brakes.

   - NOTE: Air brakes should not be pumped.

4. If EV has drum brakes, to stop as fast as possible:

   a. Smooth braking action.

   b. Pumping the brakes is mandatory. The goal is to allow the brakes time to cool.

   c. Smooth, rapid pumping to the point just before the wheels lock is the best bet.

   d. The pumping action should be of sufficient duration and force to transfer the vehicle weight to the front wheels without locking up the wheels.

NOTES

TSG - I-F-57

* * END OF MODULE 9 * *

Review Exercises

1. Write a brief description of the purpose of emergency signaling equipment.

The purpose of emergency signaling equipment is to inform traffic (and the public in general) of the presence of an emergency vehicle and thus, to aid in clearing a path for the EV.

2. Circle the letter in front of the statements that are correct:

[✓ a.] YOU are required to use emergency signaling equipment whenever any of the exemptions to the state law are exercised.

b. An ambulance with a patient aboard should use emergency signaling equipment at all times.

[✓ c.] At high speeds, it is possible to "out-run" the siren sound.

[✓ d.] When siren is on, it is a good idea to leave driver's window partly open.

e. It is especially important to turn the siren on at railroad crossings.

f. It is especially important to turn the siren on at intersections.

3. When parallel parking on a slope, how should the vehicle's wheels be positioned?

So that the wheels will hit the curb and prevent rolling, or so that the vehicle cannot roll through traffic lanes.

4. Sam (the operator) and Joe are in the control cab on a van ambulance. As Sam is backing out of a parking stall, a sudden jolt and a tinkling sound tell them they have hit something. Sam was monitoring the left outside mirror as well as the center rear-view mirror and Joe was monitoring the right outside mirror. What more might have been done to avoid this accident?

Sam should have assigned Joe to direct the backing operation from the rear, outside of the vehicle.

5. Briefly describe the provisions of the state statute that deals with motorists' responsibilities for clearing a path for emergency vehicles.

-Localize

6. Circle the letter in front of the statement which describes the best siren-use technique for negotiating through heavy or blocked traffic:

a. Low-pitch (growl) constant siren.

b. No siren.

c. High-pitch constant siren.

[✓ d.] Intermittent siren.

7. Circle the number that represents the percentage of emergency vehicle accidents that occur at intersections.

35 percent [✓ 50 percent] 65 percent

8. Circle the letter in front of the method appropriate for checking traffic before crossing an intersection.

   a. Look right, then left, then right again.

   [✓ b.] Look left, then right, then left again.

   c. Look left, then right.

   d. Look right, then left.

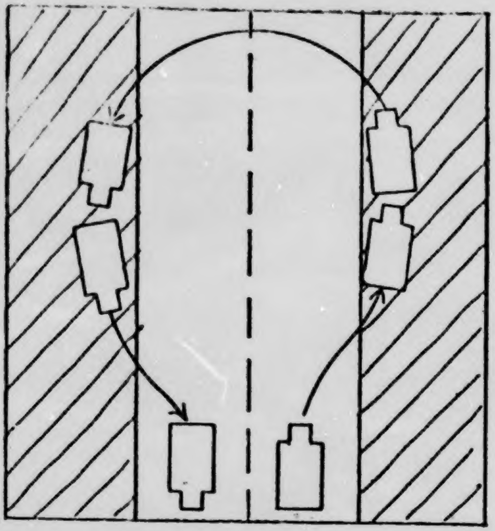
9. State which type of turn, a right or left, requires a larger gap in cross traffic. Explain your answer.

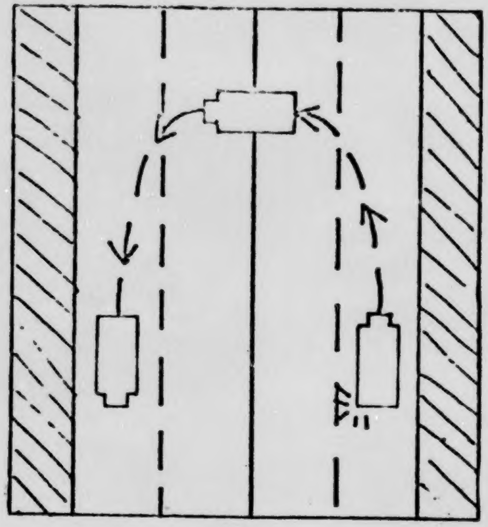
   Left. Because traffic lanes must be crossed.

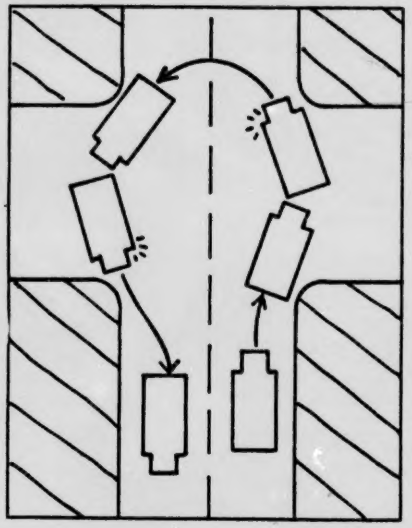
10. What is the safest type of turnabout?

   U-turn.

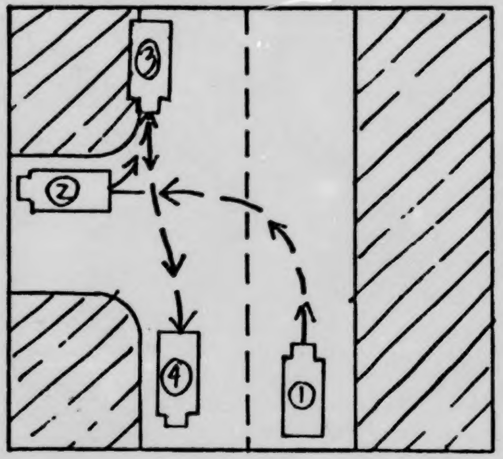
11. On the illustrations below, draw the correct path for a vehicle making U-turns.

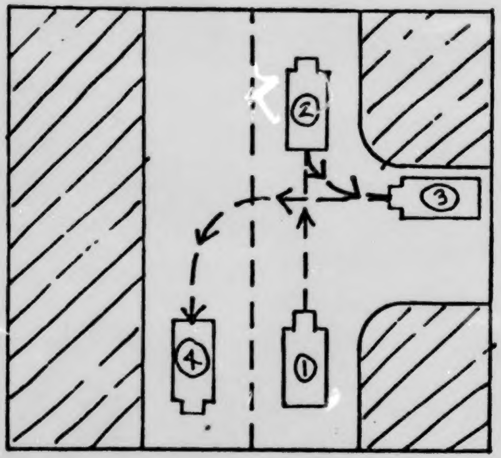






12. On the illustrations below, draw the correct path for a vehicle making a left and a right side-road turnabout.





13. Write a brief description of the two methods of estimating following distance.

Estimate car lengths: One car length for every 10 mph.

Two-second rule: Maintain a separation of at least two seconds between the EV and the vehicle being followed.

14. Of the items that appear below, some are cues to increase following distance. Circle the letter in front of those items.

    [✓ a.] When following a vehicle that is being driven erratically.
    b. When operating in the emergency mode.
    [✓ c.] When weather conditions are poor.
    d. When following a late-model sports car.
    [✓ e.] When traveling on damaged road surfaces.
    f. When traveling during rush hour.
    g. When following another EV.

15. Below are several statements relating to following distance. Circle the letter in front of those that are correct.

    [✓ a.] Following at the full stopping distance is unnecessary.
    [✓ b.] Not all vehicles have the same stopping distance for a given speed.
    [✓ c.] Vehicle condition can have an effect on stopping distance.
    d. In general, large, heavy vehicles require less distance to stop.
    e. Following distance should be decreased when traveling in the emergency mode.

16. Name two types of road configuration (not lane markings or signs) that indicate it is unsafe to pass.

-Hillcrests.

-Curves.

-Intersections.

17. In a 45 mph zone, the EV is traveling 45 mph. Circle the letter in front of any of the following statements that indicate it is unsafe for the EV to pass.

[✓ a.] Four-lane divided highway, heavy traffic in all lanes.

[✓ b.] Vehicle to be passed is traveling at the posted limit.

c. Two-lane road, broken center line, hillcrest approximately 1/4 mile ahead.

[✓ d.] Straight two-lane road, broken center line, small driveway intersecting to the left approximately one block ahead.

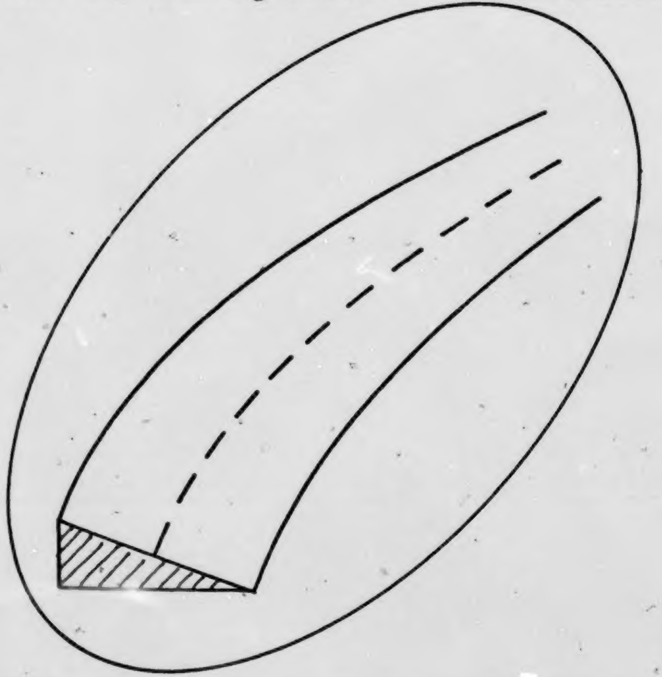
18. Write a brief definition of the meaning of a "Yield" sign.

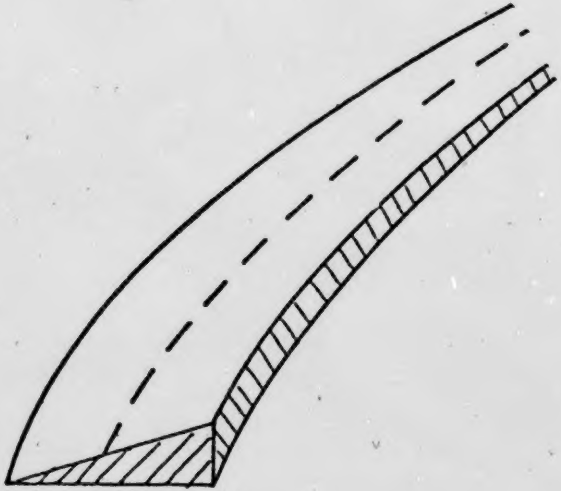
Yield sign requires that the right-of-way be given to any traffic that is close enough to be a hazard.

19. Select the siren-use technique most appropriate for entering and exiting expressways. Circle the letter in front of that item.

- a. Intermittent siren.
- b. Low-pitch (growl) siren.
- [✓ c.] No siren.
- d. High-pitch siren.

20. Circle the drawing below that illustrates a properly banked road.





21. For each of the sentences relating to driving curved roads at high speed, insert the word(s) that best completes that sentence.

 a. On a decreasing radius curve the maximum possible entry speed is too *fast or high* for the later (tighter) portion of the curve.

 b. The *tighter* the curve, the slower the EV must go.

 c. Brake or decelerate to the proper entry speed *before* entering a curve.

 d. Entry speed for any curve can be increased somewhat by entering the curve on the *high* side.

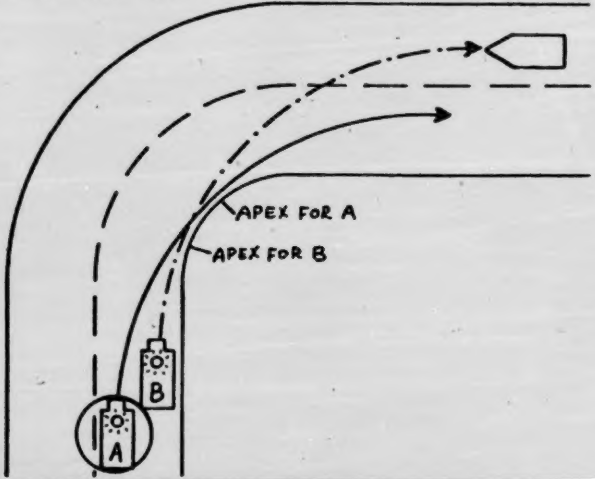
 e. On a decreasing radius curve, if the speed is too high for the tighter portion of the curve, vehicle control will be *lost or impossible*.

22. On the drawing below, the two vehicles are just beginning their turn. Circle the vehicle that has chosen the correct entry position for the curve. Give reasons why the position of the vehicle you chose is correct.

-On the high or outside of the curve.

-Turn was begun earlier.

-Vehicle B will end up in opposing lanes of traffic.



Description of Unit

This unit covers various adverse conditions (e.g., rainy weather) and includes specific precautions and procedures for driving in those conditions. This unit also provides a description of the more common "contingency situations" and the specific procedures that should be followed should such a contingency arise. The unit concludes with a module on appropriate procedures for pulling off the road.

Module 1 - 40-50 Minutes

1. INTRODUCTION. A brief overview of the unit content.
2. DRIVING IN ADVERSE CONDITIONS. Includes knowledge about, and procedures for, driving at night and driving in wet, snowy, icy, or foggy weather.

Module 2 - 40-50 Minutes

1. HANDLING CONTINGENCY SITUATIONS. Precautions to Help Prevent Contingencies. Presents the primary causes of contingency situations, and precautions that can be taken to minimize the likelihood of their occurrence.
2. General Techniques for Handling Contingencies. Presents general techniques, including evasive maneuvers, for handling many contingency situations.
3. What Would You Do?--Practice. Presents practice exercises for taking evasive actions to avoid an accident.
4. Handling Skids. Provides knowledge about skids in general and describes four basic types of skids (including hydroplaning). Procedures for correcting and/or avoiding skids are also presented.
5. Handling Other Specific Contingencies. This part of the module presents recommended procedures for handling specific contingencies (e.g., brake failure).

Description of Unit (Continued)

Module 3 - 30 Minutes

1. IF YOU MUST PULL OFF THE ROAD. Describes procedures to be followed when an operator must pull off the road unexpectedly, or when a vehicle is stopped on the road due to a malfunction. Includes use of lights to signal surrounding traffic, and use and placement of emergency warning devices (e.g., flares, reflectors).

Review Exercises - 20 Minutes

Written review questions on material presented in Modules 1, 2, and 3. Time estimate allows for discussion and explanation after the trainees have completed the exercises.

Trainees' Knowledge Objectives

Module 1

By the end of this module, the trainees:

1. Given a list of statements relating to driving under adverse conditions, will be able to identify those that are correct.

Module 2

By the end of this module, the trainees:

1. Given a list of several items, will be able to determine which of the items are impact-absorbing (if struck with a moving vehicle) and which are not.
2. Will be able to state the three primary steps that should be taken in controlling any type of skid.
3. Given several statements relating to off-road recovery, will be able to distinguish those that are correct from those that are not.
4. Given a list of vehicle malfunctions, will be able to describe the appropriate driver response(s) for handling the malfunction.

Trainees' Knowledge Objectives (Continued)

Module 3

By the end of this module, the trainees:

1. Given a list of several emergency vehicle light arrangements that could be used to warn other motorists, will be able to rate them in order of effectiveness.

2. Given two drawings of a disabled vehicle (off-road and on-road), will be able to indicate proper placement of warning devices (e.g., flares, reflectors).

Instructor Preparation Activities

Module 1

1. Read over the entire module and be prepared to present a lecture on those materials.
2. Preparation for I-G-11. Determine which of the adverse weather conditions discussed is most relevant for the class, given the terrain and climate in which the trainees will be working. You may want to consult the references and expand the material for any that are particularly relevant.

Equipment: Chalkboard and chalk.

Materials: None.

Module 2

1. Read over the entire module and be prepared to present a lecture on those materials.
2. Preparation for I-G-22. If possible, find out what kind of braking systems are on the vehicles that the trainees will be driving on the job. Be prepared to present the information in class.

Equipment: Chalkboard and chalk. Overhead projector.

Materials: Transparency Nos. 21, 22, 23.

Instructor Preparation Activities (Continued)

Module 3

1. Read over the entire module and be prepared to present a lecture on those materials.
2. Preparation for I-G-43. Find out if there are local or departmental policies re: using lights as emergency warning devices that conflict with those presented in this module. If there are any such policies, be prepared to present them to the trainees in the class.
3. Obtain some flares or fusees and demonstrate their use (outdoors), if trainees will be using them on the job.

Equipment: Chalkboard and chalk.

Materials: Flares, fusees. Transparency Nos. 24 and 25.

Additional Resource Documents:

Bibliography and reference no.: 39.

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES

INTRODUCTION

This unit is divided into three modules, Driving in Adverse Conditions, Handling Contingency Situations, and If You Must Pull Off the Road.

-Ask the trainees if they can think of the "adverse conditions" that might be covered in that part of the unit.

- Night driving.
- Weather conditions (leading to poor road condition, decreased traction, etc.).
- Poor visibility conditions (including smog, fog, mist, etc.).

-Ask the trainees what they think the word "contingency" as used in this unit means.

- A sudden or unexpected occurrence or condition that is potentially dangerous.

-Ask the trainees what kind of information the last module, "If you must pull off the road," might contain.

- Procedures and techniques for protecting the EV and the operator.
- Procedures for using emergency warning devices (e.g., flares, reflectors).

NOTES

* * * BEGIN MODULE 1 * * *

TSG - I-G-3

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES | **NOTES**

DRIVING IN ADVERSE CONDITIONS

TSG - I-G-4

Driving techniques must be adjusted for all adverse conditions:

A. Slow down.

- Drive at a speed appropriate for conditions.

B. Increase following distance.

Night Driving

-Write the following statistics on the chalkboard:*

CHALKBOARD

	Day	Night
Percentage of accidents	70	30
Percentage of fatalities	53	47

-Ask the trainees what conclusions they can draw from these statistics.

- Nearly one-half of all fatalities occur at night; but less than one-third of all accidents occur at night.
- Thus, a much higher proportion of night-time accidents result in fatalities.

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*39

UNIT TITLE	HANDLING UNUSUAL SITUATIONS	**UNIT PAGE**	I-G-9

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES	**NOTES**
A. Causes of accidents (more likely to occur at night):	TSG - I-G-4
1. Less light to see by. Vision is restricted. Some facts to remember:	
a. Night-vision varies considerably among persons.	
b. Older people's night vision is not usually as good as younger people's.	
c. Eye-straining activities (during the day) can reduce night-vision.	
d. Sunglasses reduce eye-strain in bright sun, but they should NEVER be worn after sunset.	
e. Bright flashes of light (lightning, high-beam glare) can cause momentary blindness.	
2. Drunk drivers:	TSG - I-G-5
a. Search for indications of drunk drivers.	
•Weaving across lanes.	
•Delayed start at a stop sign or traffic light.	
•Erratic speed.	
b. Be especially alert between 11 and 3.	
3. Tired drivers:	
a. Allow extra space and time for other drivers to react.	
b. Don't be a tired driver--begin shift well rested.	

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES	NOTES
B. Using headlights and high beams:	TSG - I-G-5
1. Headlights:	
a. Use headlights at all times between first signs of dusk and full daylight.	
●Many drivers have developed the habit of putting on parking lights at dusk. This is a bad practice. As soon as daylight is noticeably diminished, headlights should be turned on.	
b. Keep headlights clean and properly aimed.	
c. Replace burned-out lights immediately.	
2. High beams:	
a. Dim high beams within 500 feet of approaching vehicle.	
b. Dim high beams within 300 feet of overtaking or following other vehicles.	
c. Avoid high beams on right curves--they tend to blind the oncoming driver.	TSG - I-G-6
d. Don't stare directly into high beams. Guide the vehicle by using the right edge of the road.	
●Flicking high beams up and down to signal a motorist to lower his beams can be dangerous; it can momentarily blind the other driver.	
C. Tips to improve visibility at night:	
1. Keep windshield clean, inside and out.	

TSG - I-G-6

- Cigarette smoke builds a film on the inside of windows.
- Dirty windshields make lights "sparkle." The pupils continuously expand and contract, causing eyestrain and headaches.

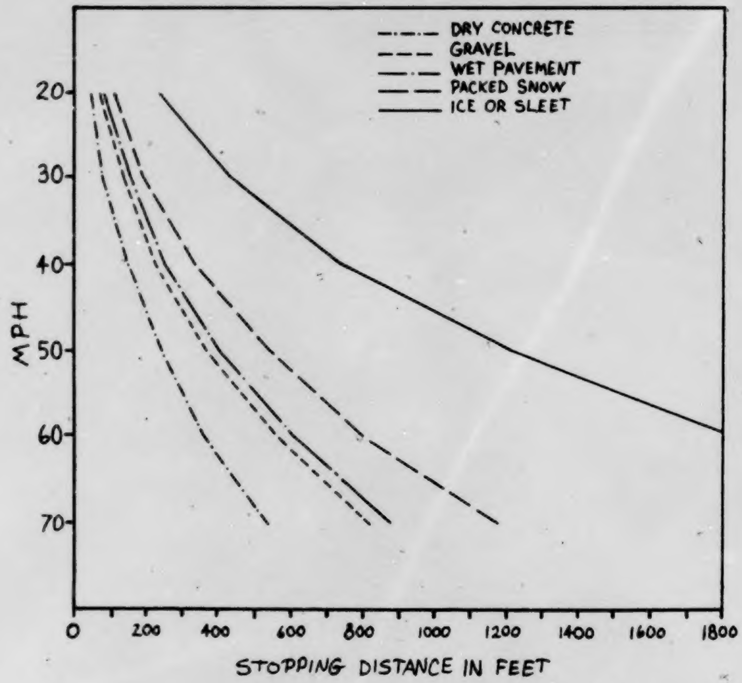
2. Keep instrument panel lights dim.
3. Slow considerably on curves or when turning.
   - Headlights light up less of the roadway on curves or when turning.
4. Keep eyes moving.
   - Moving eyes can pick out dim objects better than tightly focused eyes.

Adverse Weather Conditions

The chart on the following page provides an indication of relative stopping distances at different speeds and in different weather conditions.

-Point out these facts to the trainees:

- Stopping on wet pavement takes approximately twice the distance as stopping on dry pavement.
- Stopping on ice or sleet takes about five times the distance as stopping on dry pavement.
- Coming to a complete stop, on ice or sleet from 30 mph requires as much distance as coming to a complete stop from 65 mph on dry pavement.



- *Ask the trainees what conclusions they can draw about following distances, based on the facts presented in the chart.*

  - In any adverse weather condition, following distance MUST BE INCREASED.

  - Following distance should be increased proportionately to the severity of the prevailing weather condition.

TSG - I-G-7

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES | **NOTES**

A. Wet or rainy weather:

TSG - I-G-6

1. Approximately six times more people are killed on wet roads than on snowy and icy roads combined.*

2. When it first begins to rain, roads are especially slippery.

   - When it first starts to rain, water mixes with oil and dust to form a slippery mixture. This mixture will wash away in a while if the rain is hard and/or prolonged.

3. When possible, avoid making sudden moves with the steering wheel, brakes, or accelerator in rainy weather.

4. Driving through large areas of water can affect brake performance and the vehicle's electrical system. Precautions:

TSG - I-G-7

   a. Slow down before hitting water.

   b. Turn wipers on before hitting water.

   c. Tap brakes as you exit.

      - If vehicle pulls to one side, make several light brake applications to help dry the brakes.

5. Double-check mirrors; rain on rear window or mirrors can distort or obliterate images.

TSG - I-G-8

B. Winter Driving (including sleet, freezing rain, packed snow, and ice).

- These conditions are especially hazardous. Sometimes loss of control due to skidding cannot be prevented.

---

*39

1. Advance preparation:

TSG - I-G-8

   a. Engine tuned.

   b. Heater/defroster in good working order.

   c. Battery charged.

   d. Emergency weather equipment.

      - Chains.
      - Shovel.
      - Sand.

   e. Snow tires and/or chains.

      - Snow tires are good; studded tires (if legal) are better; chains are best.

   f. Brakes adjusted.

-*Emphasize the importance of evenly adjusted brakes. Ask the trainees what might happen on slippery roads if the brakes pulled to one side.*

- Skidding and loss of control could result.

2. Tips for driving on ice and snow:

   a. Stay aware of temperature. "Wet" ice and freezing rain are the most treacherous of all driving conditions.

      - Wet ice and freezing rain occur when the temperature hovers around the freezing point (28°F to 40°F).

- Bridges freeze several degrees before road surface.

TSG - I-G-8

b. Don't make any sudden moves with the steering wheel, brakes, or accelerator unless absolutely necessary.

-Tell the trainees that the procedures for correcting skids will be covered in the Contingency portion of this unit.

C. Poor visibility conditions, including fog, mist, smog, etc.

1. Drive slowly, but keep moving.
2. Turn lights (low beams only) and wipers on.

TSG - I-G-9

3. Use four-way flashers if traveling 15 mph or more below speed limit.
4. Watch for cars ahead that are moving very slowly.
5. Watch the rear-view mirror carefully.
6. Avoid decelerating suddenly.
7. If you must pull off the road, use four-way flashers.
8. Do not pass.
9. Use defroster to minimize fogging on inside of window.

-Point out to the trainees that patches of fog, etc., are extra hazardous.

- Occurrence of patches of fog and their density are unpredictable.
- Vehicles ahead entering a patch of heavy fog may brake hard and suddenly.

* * END OF MODULE 1 * *

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES | **NOTES**

* * * BEGIN MODULE 2 * * *

HANDLING CONTINGENCY SITUATIONS

TSG - I-G-10

A. Contingency situations can arise at any time. When they arise, normal traffic flow may be suddenly interrupted and the safety of all persons in the general area diminished.

B. It is a good policy to be familiar with the contingency situations that occur most often, and to understand the actions that can be taken to minimize the likelihood of death of injury.

C. The four primary causes of contingency situations:

-Ask the trainees if they can figure out what the four primary causes might be:

- Vehicle malfunction or failure.
- A sudden change or deterioration in the road.
- The appearance of an obstacle in the roadway.
- DRIVER ERROR; clearly a contributing factor in most accidents.

Precautions to Help Prevent Contingencies

TSG - I-G-11

This section addresses precautions the operator can take to minimize the chances of a contingency occurring.

A. Vehicle malfunction or failure:

1. Inspect the EV at the beginning of every shift.

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES

2. Correct/repair malfunctions/problems promptly.
3. Monitor to detect:
    a. Noises.
        - Clunks in steering.
        - Dragging muffler.
        - Squealing brakes.
    b. New or changed vibrations.
        - Alignment.
        - Worn bearings.
    c. Odors.
        - Brake linings.
        - Gas leakage.
        - Fire.
    d. Changes in handling characteristics.
        - Too much play in steering.
        - EV pulls to one side when braking.
        - Brakes grab.

B. A sudden change or deterioration in the road (weather, damage, construction, etc.).

NOTES

TSG - I-G-11

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES	NOTES
1. Remain alert.	TSG - I-G-11
2. Scan well ahead.	
3. Look for cues.	TSG - I-G-12
•Construction signs.	
•Skid marks on the road surface.	
4. Know the area!	
•Which roads become slippery when wet.	
•Which roads are in poor repair, etc.	
•Which roads have tight (decreasing radius) curves.	
C. The appearance of an obstacle in the roadway (includes pedestrians, other vehicles, etc.).	
1. Maintain a safe speed; one which allows maximum vehicle control.	
2. Search for obvious cues.	
•"Watch Children" and "School" signs.	
•Heavy pedestrian traffic.	
3. Learn to spot subtle cues.	
•Toys, bikes on lawns (even though no children are visible).	
•Vapor from exhaust of parked cars.	
•Back-up lights on parked cars.	

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES	NOTES
D. Driver error.	TSG - I-G-12

1. Begin shift well-rested, with no unusual physical or mental impairment.

   - Personal problems resulting in mental or emotional strain can affect driver's performance.

2. Remain alert.

3. Avoid unnecessary risks.

4. Don't panic.

- Even under the most favorable conditions, when all precautions have been taken, contingencies will arise. Knowing what to do when they arise will minimize the risk of death, injury, and serious property damage.

General Techniques for Handling Contingencies

Hundreds of "possible" contingencies could arise. Since EV operators may spend many hours driving (and travel many thousands of miles), it is probable that sooner or later a contingency will occur. Following are general techniques that can be applied to deal with many of the possible situations:

A. Evasive steering, or a sudden or extreme change in the vehicle's direction, is often used to avoid pedestrians, vehicles, or other obstacles. This action is usually taken because it is too late to brake to a stop.

TSG - I-G-13

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES

NOTES

TSG - I-G-13

- Animals in the roadway are often a problem--especially in rural or suburban areas. If a large animal (e.g., deer, bear) appears on the road it is usually best to avoid colliding with the animal--serious damage and injury often occur.

- When small animals are in the roadway, however, it is often safer to collide with the animal rather than risk loss of control due to a sudden steering or braking maneuver.

1. Scan the roadway and nearby areas for escape routes. Consider:

   a. Can the vehicle be safely steered off the right side of the road?

   b. Off the left side of the road?

      - The right side of the road is usually far safer than the left, although there are exceptions (e.g., divided highways with wide, level median).

   c. Any obstacles on the roadside?

   d. Any oncoming vehicles?

   e. How stable is the road surface (e.g., gravel vs. concrete); is it likely to contribute to loss of control?

2. Scan especially carefully when approaching the crest of a hill, rounding a curve, and when approaching intersections.

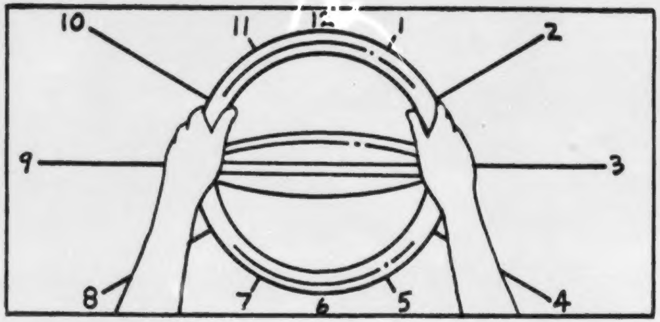
   - These situations minimize possible escape routes.

3. Evasive steering maneuvers are performed in the following way:

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES

NOTES

TSG - I-G-13



TSG - I-G-14

a. Hands should be at 3 and 9 o'clock on the steering wheel--this will allow the largest possible turn without moving the hands.

- The 2 and 10 o'clock position is a little more comfortable, but the 3 and 9 o'clock position allows maximal directional control.

b. Turn the steering wheel sharply in the direction of escape route.

c. Countersteer as soon as vehicle is clear of obstacle.

d. Although it may be necessary to brake somewhat, hard braking should be avoided.

- Hard braking can lock the wheels--locked wheels won't steer!

e. Slow down and maintain vehicle control.

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES	NOTES
-Explain that the abruptness with which an evasive steering maneuver can be made safely depends, somewhat, on the type of vehicle.	TSG - I-G-14

- Sedan--very abrupt maneuvers are possible unless wheels will hit curb, rut, etc.
- Van--depending on type. Some may be "top heavy" and could roll if maneuver is excessively abrupt.
- Large truck--steering ratio usually precludes excessively abrupt maneuver.

-Explain that trainees will have a chance to practice evasive steering later. They will develop a "feel" for their EV's handling characteristics.

B. Emergency braking. If there is enough room to stop, or if no escape route is available, emergency braking may be one way to avoid a collision or minimize the consequences. Goal: produce shortest possible stopping distance without locked wheels or loss of control. The best method for accomplishing this is:

1. Hard pressure to brake pedal without locking wheels:
    a. Quick, firm jabs.
    b. Short, steady pressure; release; repeat.
2. If wheels lock, RELEASE BRAKE PEDAL. Reapply with less pressure.
    - The best braking method is somewhat dependant on whether the vehicle is equipped with drum or disc brakes.

-If you have information about the kinds of brakes the trainees on-job EVs are equipped with, go into a little detail about braking methods for those particular vehicles.

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES | **NOTES**

- Disc brakes can take more sustained hard braking since they cool off more effectively and are less likely to fade.

TSG - I-G-14

3. Rapid deceleration could cause a rear-end collision.

- In some cases a rear-end collision is preferable to the alternative (e.g., hitting a pedestrian). Each case must be judged independently.

C. Evasive acceleration simply means a quick burst of speed. Can be used to avoid collision with side-approaching or merging vehicles.

- Drivers often don't think of this evasive maneuver.
- When a vehicle is approaching from the side or merging, increasing speed often can avoid collision.

D. Unavoidable collisions. When collision is unavoidable, choose object to collide with. Considerations are:

TSG - I-G-15

1. Choose course least likely to cause death or injury, or the course that will cause the fewest injuries.
2. Head-on collisions are the most damaging in terms of both life and property.
    a. Steer so that EV sideswipes or hits the other object at an angle.
    b. Avoid hitting large, immobile objects in favor of "impact-absorbing" objects.

-Ask the trainees if they can think of some examples of impact-absorbing objects and immobile (nonimpact-absorbing objects). Have them help develop this list:

- IMPACT-ABSORBING:

TSG - I-G-15

  - Parked cars.
  - Low bushes and shrubs.
  - Small signs (e.g., stop sign, speed limit).
- NONIMPACT-ABSORBING:
  - Concrete bridge abutments (just about anything made of concrete).
  - Buildings.
  - Large trees.
  - Utility poles (also pose the hazard of power lines).

What Would You Do?--Practice

TSG - I-G-16

A. Each of the drawings in this practice section illustrates a potential accident.

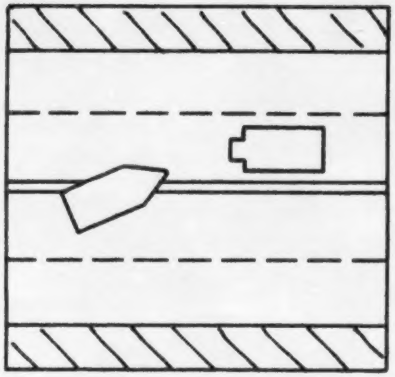
B. The things that could be done to avoid an accident include:

1. Emergency braking.
2. Evasive steering.
3. Evasive acceleration.
4. No action.

-*Lead a short discussion about each of the illustrations. Call on a trainee to tell which action or combination of actions seems most appropriate for each drawing. Present the correct answer, if the class is unable to figure it out.*

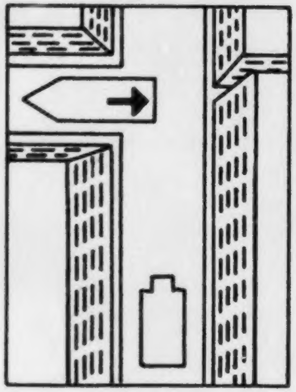
The EV is traveling on a four-lane road with no median. Gravel berms are on both sides of the road. The only other vehicle in the immediate vicinity is the car that appears to be out of control--it is crossing the center line and headed for the EV.

TSG - I-G-16



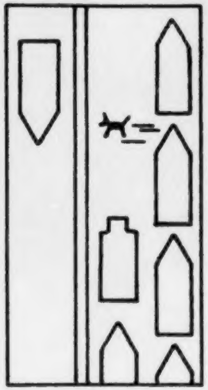
PRESENT TRANSPARENCY 21a

- Evasive steering.
- Steering to the right berm is probably best, since more traffic could be in the oncoming lanes. Also, the driver of the out-of-control vehicle may suddenly straighten out and pull back into his lane.

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES	NOTES
The EV is traveling at about 25 mph down a narrow, one-way alley. On either side of the alley are buildings set very close to the street. A large truck begins to back out of an intersecting alley to the left.	TSG - I-G-17
	PRESENT TRANSPARENCY 21b
•Emergency braking and, perhaps, evasive steering. •The operator could sound his horn to alert the truck driver, but a collision is probably unavoidable. Evasive steering alone is inappropriate, since it would be unwise to strike large buildings--they are nonimpact-absorbing. The truck might stop, allowing the EV to steer around it.	

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES

The EV is traveling at about 30 mph on a busy, urban street. A car is behind the EV, following closely. Another car is approaching in the opposing lane of traffic. Parked cars are in the lane immediately to the EV's right. A small dog runs out into the roadway.



- •No action.
- •Either braking or steering will certainly cause an accident. There is some chance the animal will clear the EV if no action is taken.

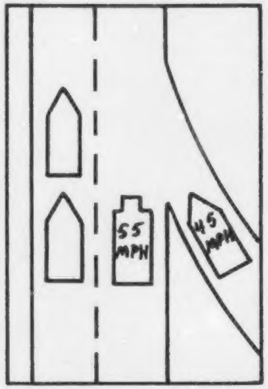
NOTES

TSG - I-G-17

PRESENT TRANSPARENCY 21c

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES

The EV is traveling 55 mph in the right-most lane of a four-lane divided expressway. Two cars are in the left lane beside the EV. A car is about to enter the expressway from the entrance ramp; it is traveling approximately 45 mph.

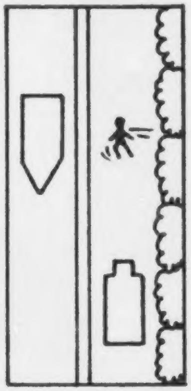


- Evasive acceleration.
- Braking would probably increase the chances of collision with the merging car and would open the possibility of being rear-ended.
- No action would probably result in a collision.

NOTES

TSG - I-G-18

PRESENT TRANSPARENCY 21d

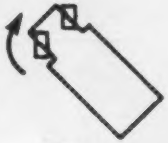
INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES	NOTES
The EV is traveling on a two-lane rural road. There is a car in the opposing lane. On both sides of the road is a heavy growth of low bushes and shrubs. A small child runs out into the road.	TSG - I-G-18
 •Evasive steering and emergency braking. •Braking alone will not allow the operator to avoid hitting the child. Since the low bushes and shrubs are impact-absorbing,it would be wise to steer towards the right side of the road and collide with them at an angle.	PRESENT TRANSPARENCY 21e
Handling Skids	TSG - I-G-19
Skidding means loss of steering and braking control.	
A. The primary causes of all skids:	
1. A too-sudden change of speed or direction.	
2. Any change of speed or direction under conditions of poor traction.	
B. To help regain control no matter what type of skid is occurring:	
1. Stay OFF the brake.	
2. Stay OFF the accelerator.	

UNIT TITLE	HANDLING UNUSUAL SITUATIONS	**UNIT PAGE**	I-G-30

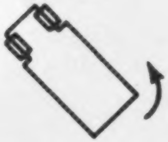
INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES	**NOTES**
3. Countersteer; steer in the direction to which the rear end of the vehicle is skidding. Two points about countersteering:	TSG - I-G-19
a. Steering wheel does not have to be turned violently to correct a skid.	
•This is a common "panic" reaction, and further trouble often arises because the car tends to skid back and forth (fishtailing).	
b. Once the wheel has been turned to countersteer, it may be necessary to immediately countersteer in the other direction.	
-*Explain the illustration of countersteering that appears on the next page.*	PRESENT TRANSPARENCY 22 TSG - I-G-20
C. Specific skids:	TSG - I-G-21
1. Braking skid. This kind of skid occurs when, due to sudden, hard brake pressure, one or more of the vehicle's wheels lock. If brakes are evenly adjusted, all wheels will lock at the same time.	
•A good reason to keep brakes properly adjusted--an all-wheels-locked skid is easier to control.	
•Regardless of how many wheels lock, or how evenly, steering control will be lost. A WHEEL THAT IS NOT TURNING CANNOT BE STEERED.	
a. If all wheels lock evenly or if just the front wheels lock, the vehicle will move straight ahead, unless influenced by some other force (e.g., a dip in the road).	

READ FROM BOTTOM

7. Steering control is reestablished.

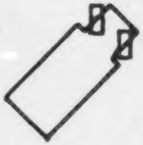


6. To control fishtailing in the opposite direction, you'd countersteer right to help you get back on course.

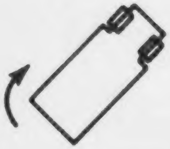


5. The back end fishtails to the right.

4. The vehicle is back on course.



3. You'd steer left, in the direction you want the vehicle to go relative to the way it's facing.



2. The back end of the vehicle skids around to the left (the vehicle is still moving forward at an angle).

1. The vehicle is going straight.

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES	NOTES
b. If just the rear wheels lock, their reduced traction will cause them to move forward faster than the front wheels.	TSG - I-G-21

- The vehicle may spin 180° (depending on speed, road surface, etc.). The vehicle may actually end up traveling in the opposite direction.

c. Actions to take if a braking skid occurs:

1) Release brakes immediately; it should then be possible to steer.

   - Releasing the brakes allow the wheels to turn.

2) If braking is still necessary (to reduce speed or avoid an obstacle), apply with less pressure so that wheels don't lock again.

-Ask the trainees to think of some examples of a situation where a braking skid might occur. Some examples are:

- Hard braking on wet, snowy, icy, or debris covered roads.
- Hard braking at high speed.

2. Power skid. This kind of skid occurs due to sudden, hard acceleration.

- Since power is delivered only to the rear wheels, sudden acceleration can cause the rear wheels to lose traction. Even though the cause is different, a power skid is very similar to a braking skid.

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES | **NOTES**

a. The back end of the EV may skid to one side, trying to overtake the front end.

TSG - I-G-21

- The tendency for the rear end to slide will be greatest if the front wheels are turned.

b. The vehicle may spin all the way around.

c. Actions to take if a power skid occurs:

1) Ease off the accelerator.

2) Countersteer in the direction towards which the rear end of the vehicle is skidding.

TSG - I-G-22

-Ask the trainees to think of an example of a situation where a power skid might occur. Some examples are:

- Accelerating on wet, icy, snowy or debris covered roads.
- "Jack rabbit" starts.

3. Cornering skid. This kind of skid occurs when speed is too great or traction is reduced (due to poor road/weather conditions) such that the vehicle cannot stay on the intended track around a curve.

- The cornering skid can occur even at normal driving speed if traction is reduced by tire or road surface condition.

a. The vehicle may continue to travel straight ahead--not in the intended path of travel around the turn.

- This is sometimes called "ploughing."
- This is a full cornering skid--all four wheels lose traction.

b. The rear end of the vehicle may try to overtake the front end, if just the rear wheels lose traction.

TSG - I-G-22

- This is sometimes called a "spinout."

c. Actions to take if a cornering skid occurs:

1) Ease off the accelerator.

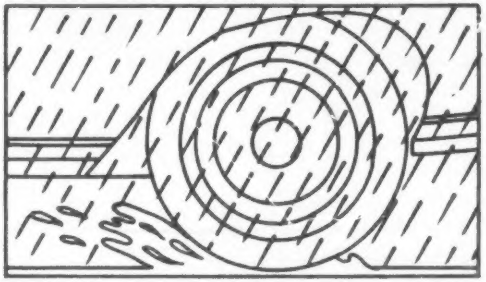
2) If the vehicle is spinning out, countersteer as space permits.

- This will align front and rear wheels and control may be regained.

4. Hydroplane skid. Hydroplaning occurs when the tire is moving too fast for the water on the road to escape (to flow around it or through the tread). A small wedge of water builds up in front of the tire and lifts it off the surface of the road.

TSG - I-G-23

PRESENT TRANSPARENCY 23a



INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES

a. The results of a hydroplane skid are difficult to predict:

1) As in all skids, there is loss of braking and/or steering control.

2) Unless the operator attempts to brake or steer (other than straight ahead) he may not know he is hydroplaning.

b. Actions to take if a hydroplane skid occurs:

1) Ease off brake or accelerator.

2) Allow the vehicle to decelerate.

- Since hydroplane skids are difficult to detect and control, the most effective thing an EV operator can do is to prevent them:
  - Inspect tires regularly to ensure they have plenty of tread (to allow water to escape) and that pressure is correct.
  - Be alert for hydroplane-type conditions--if there is enough water on the road surface to cast reflections from trees or other cars, be especially cautious; slow down.

Handling Other Specific Contingencies

The occurrences and conditions listed in this part of the unit should be handled according to the procedures outlined:

NOTES

TSG - I-G-23

A. Blowout. Front tire blowouts are the most dangerous; the vehicle will pull to the side of the blown-out tire (see illustration below).

TSG - I-G-23

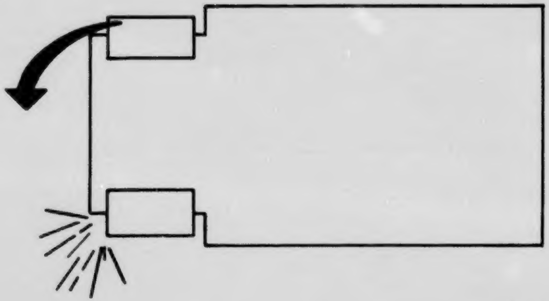
1. Remove foot from accelerator, allowing vehicle to slow.

TSG - I-G-24

2. Hold steering wheel firmly; anticipate steering difficulty.

3. When steering is controlled, brake gradually; avoid locking wheels.

PRESENT TRANSPARENCY 23b



- The vehicle will pull to the side of the blown-out tire because the flat grips the road with more rubber (and more friction) and acts as a pivot.

B. Brake failure.

1. Shift to lowest gear, if possible.

2. Apply parking brake in either of the following ways:

   a. In a pumping manner--steady pressure, release, etc.

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES	NOTES
b. As hard as possible, without locking the wheels.	TSG - I-G-24
•Procedure 2.b will slow and stop the vehicle in the shortest distance. It is however, very difficult to avoid locking the wheels.	
3. Pump brake pedal rapidly.	
•This may build up some pressure in the brake lines and provide some braking force.	
4. If these actions do not slow the vehicle, sound horn to alert traffic; activate four-way flashers and/or emergency signaling devices; choose an impact-absorbing object to collide with, if necessary.	
a. Avoid head-on collisions.	TSG - I-G-25
b. Try to sideswipe parked cars, shrubs, even a dirt hillside--always at an angle.	
5. If vehicle has been slowed sufficiently, select an off-road stopping place.	
a. If there is an upgrade within the assured clear distance ahead, stay on the road and allow the upgrade to further slow the vehicle, then select a path for leaving the roadway.	
b. If no upgrade is within clear distance ahead, select the path for leaving the roadway that will minimize injuries and property damage.	
C. Transmission failure.	
1. Select a safe off-road stopping place.	

2. Brake gradually to a stop.

TSG - I-G-25

D. Steering failure. Steering failure is most likely to occur when a vehicle with power steering stalls. This will make steering difficult, but not impossible.

1. Power steering stall (steering failure):

   a. Anticipate steering difficulty; grasp wheel firmly.

   b. Find safe spot and pull off the road.

2. Total steering failure:

   a. Keep trying to steer.

   b. Stay OFF the brake.

TSG - I-G-26

- Since directional control is impossible, if the brakes pull to one side it could be deadly. This is another reason to keep brakes properly adjusted.

   c. If the vehicle does not coast to a stop, shift to a lower gear and pump the parking brake (same procedure as brake failure).

E. Accelerator sticks.

1. If the accelerator sticks and there are no vehicles ahead of the EV, the operator should attempt to release the pedal by slipping the tip of his shoe under it and lifting.

- The operator should NEVER try to release it with his hands while in motion.

2. If this method is unsuccessful:

a. Put vehicle in "neutral" gear. In vehicles without power steering and power brakes, turn engine off.

- .With the engine off, it will be more difficult to steer if EV has power steering.
- .Many models of EVs have steering wheel/ignition interlocks (anti-theft). Do not turn off ignition if it will lock steering wheel.

b. If the vehicle has power- assisted brakes, do not pump them. Instead, apply steady pressure.

- .Pumping will exhaust power-assisted brakes' reserve capacity when engine is off.

c. Select a safe off-road stopping place and pull off.

d. Turn engine off if still running.

F. Visibility impaired (hood flies up, wiper or defroster failure).

1. If hood flies up, look for a gap at the bottom of the windshield.
2. If forward visibility is completely blocked, put head out side window to see forward.
3. Apply brakes moderately.
   - You could be rear-ended.
4. Continue to brake gradually and select an off-road stopping place.
5. Pull off the roadway and activate four-way flashers.

TSG - I-G-26

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES

G. Wheel(s) off the road (off-road recovery). If at some time the EV's wheel(s) leave the road surface (intentionally or unintentionally), the operator will have to perform an off-road recovery. This can be dangerous unless performed properly. Correct procedure:

1. Hold steering wheel firmly; steering may be difficult.
   - If there is a significant difference between the level of the roadway and the shoulder, or if the composition of the roadway and the shoulder are significantly different the vehicle may pull to one side.
2. Check for traffic ahead and to the rear.
3. Reduce speed by easing off the accelerator.
4. If brakes must be applied to reduce speed, brake VERY gradually.
   - If shoulder is gravel or muddy, skidding is a strong possibility.
5. Center vehicle over road edge.
6. Activate appropriate turn signal.
7. If the operator must avoid an obstacle, he should steer sharply toward the road, turning steering wheel about 90° while accelerating slightly.

-Point out to the trainees that the sharp-turn recovery (7) is dangerous.

- This procedure should only be used to avoid a collision. Two dangers: skidding, and ending up in opposing lanes of traffic.

NOTES

TSG - I-G-27

8. If the operator does not have to avoid an obstacle, he should scan the road edge to find the point at which there is the least distance between road edge and berm, turn the wheel gradually, and steer on at that point.

TSG - I-G-27

9. As soon as the EV's front right wheel touches the road edge, countersteer to control lane position.

H. Danger signals from gauges and indicators on instrument panel.

- Whenever a malfunction or danger signal appears, the EV operator should contact the dispatcher to send a back-up and/or service vehicle.
- Requesting a back-up unit is of the UTMOST IMPORTANCE if the EV is enroute to an emergency when the malfunction occurs.

1. Fuel gauge low:
   a. Continue to site if within range.
   b. Consider the amount of fuel necessary for the return trip.

TSG - I-G-28

2. Charging system fails (battery not charging).
   a. Turn off any equipment that will drain battery.
   b. If the engine is stopped, it is unlikely it will restart.
3. Brake warning light comes on:
   a. Stop immediately.
      - If there is complete brake failure use the procedure outlined in Brake Failure.

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES | **NOTES**

b. Do not drive the vehicle until maintenance has been performed.

TSG - I-G-28

-*Explain that the procedures listed below, if followed, will protect the EV and reduce the chances of a major vehicle malfunction.*

4. Oil pressure drops:

   a. Stop immediately.

   b. Do not drive the vehicle until maintenance has been performed.

5. Engine temperature rises into danger zone (and remains).

   a. Stop immediately.

   b. Do not drive the vehicle until maintenance has been performed.

* * END OF MODULE 2 * *

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES

IF YOU MUST PULL OFF THE ROAD

Due to adverse weather conditions or a contingency situation, an EV operator may need to pull to the side, or off the road. In the worst case, the operator may be unable to get the vehicle entirely off the road (and out of the path of surrounding traffic). Whenever this situation arises, both the vehicle and the operator must be protected. The goal of "protecting the scene" is to provide visible, early warning to surrounding traffic and thus avoid a collision (or avoid causing a collision). Principles:

A. Position of the vehicle is critical. The more likely a hazard it represents, the more critical the need for rapid, effective placement of warning devices.

- If the trainees, when on the job, will be working at a department with an established policy on this subject, it should be be presented. If that policy conflicts in any way with the material presented here, be sure to have the trainees write the correct policy in their study guides.

1. MOST EFFECTIVE: Emergency warning devices such as triangular reflectors, flares, fusees, etc.
    - Triangular or other reflectors are best--no fire hazard.
2. OKAY: Overhead beacon, four-way flashers, and cab lights.
    - Cab lights alone are not very effective. When used at night in conjunction with the beacon, however, they increase the overall amount of protection.
    - Other motorists are less likely to drive into the rear of a vehicle with cab lights on.

NOTES

* * * BEGIN MODULE 3 * * *

TSG - I-G-29

3. POOR: Headlights, parking lights, or nothing.

TSG - I-G-29

- Parking or headlights alone can actually increase the hazard. At night, tired motorists may tend to "follow" the lights right off the road into the rear end of the EV.

C. During daylight:

1. If the EV is well off the road, activating four-way flashers is usually sufficient to protect the scene.

2. If the EV is not well off the road, additional precautions should be taken.

   - In addition to taking the extra precaution of placing warning devices, the operator should protect himself by leaving the vehicle if collision is likely.

D. In darkness:

TSG - I-G-30

1. If the EV is on or near the road, warning devices should be positioned whenever the EV will be stopped for more than a few moments.

2. If the length of time the EV will be stopped is long or indefinite, warning devices should be positioned (whether the EV is on or off the road).

   - Again if likelihood of collision is great, operator should protect himself.

Placing Flares or Other Emergency Warning Devices

The obvious purpose of warning devices is to alert traffic to the stopped vehicle's presence, but another real goal is to cause as little interference as possible with the flow of traffic.

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES

-Point out to the trainees that the distances outlined here are guidelines, only. Actual distances must be based on the specific situation (e.g., terrain, visibility conditions).

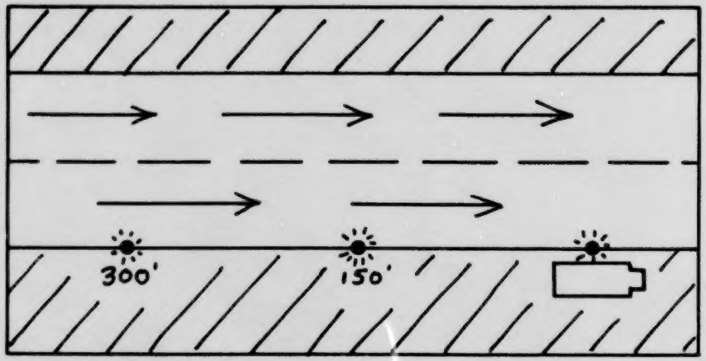
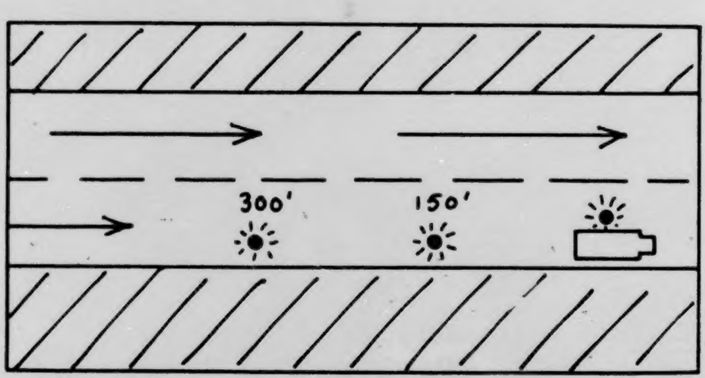
A. One-way roads (or divided expressways):

1. Start four-way flashers before leaving the vehicle--cab lights on.
2. Place a warning device just beside the vehicle, on the traffic side.
3. Place a second device 100 to 200 feet to the rear of the vehicle, on the edge of the road. If the vehicle is actually on the roadway, the device should be placed in the middle of the lane.
4. Place a third device approximately 300 feet to the rear of the vehicle, on the road edge (or in the lane if the EV is on the road).

   - When walking quickly, a normal stride is a little more than two feet.

NOTES

TSG - I-G-30

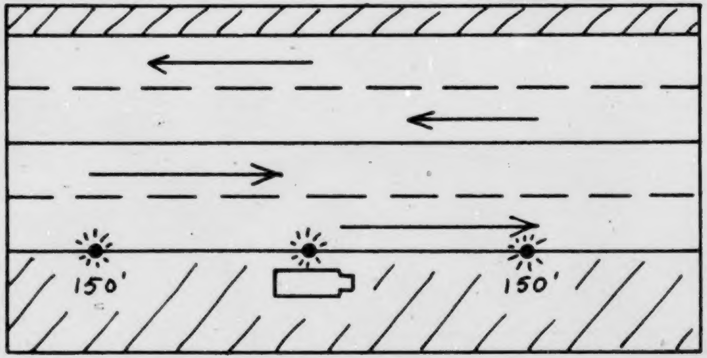
INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES	NOTES
 One-way flow of traffic. Disabled vehicle off roadway.	TSG - I-G-31 PRESENT TRANSPARENCY 24a
 One-way flow of traffic. Disabled vehicle on roadway.	PRESENT TRANSPARENCY 24b

B. Two-way traffic flow:

TSG - I-G-32

- Positioning is different due to the need to provide *oncoming* traffic with warning.

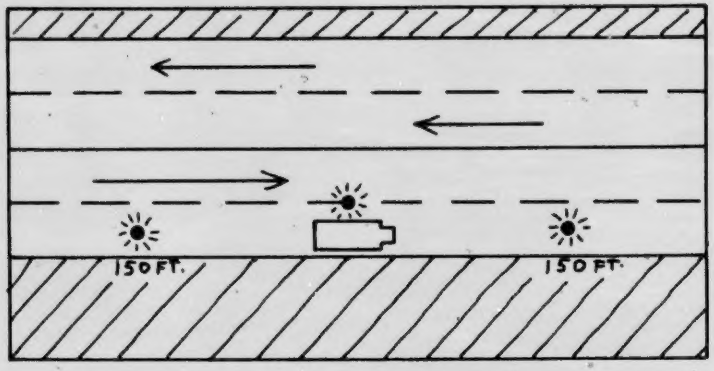
1. Start four-way flashers before leaving the vehicle--cab lights on.
2. Place a warning device just beside the vehicle on the road side.
3. Place a second device 100 to 200 feet to the rear of the vehicle on the road edge. (Again, if vehicle is *on* the road, device should be placed in the middle of the lane.)
4. Place a third device 100 to 200 feet to the front of the vehicle on the road edge.



Two-way flow of traffic.
Disabled vehicle off roadway.

PRESENT TRANSPARENCY 25a

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES	NOTES
	TSG - I-G-33 PRESENT TRANSPARENCY 25b



Two-way flow of traffic.
Disabled vehicle on roadway.

C. Use of flares or fusees:

1. Read directions accompanying the warning devices.

2. The following can be used as general guidelines if no directions are present:

   a. Do not light device until you are ready to put it down.

   b. Pull the tab near the top of the device, to free the cap.

   c. Strike the matchlike head of the flare against the strike surface on the inside of the cap; point the flare or fusee away from your body as you do this.

      - The inside of the cap is similar to the strike surface on a box of matches.

d. If flares with spiked ends are used and must be placed on the roadway:

TSG - I-G-34

1) Push them between slabs of concrete.

2) Simply lay them on the road.

- A rock or other anchoring device can be placed to keep them from rolling.

3. Flares or fusees should NOT be used if there is evidence of the following:

a. Odor of gasoline.

b. Any fluid leakage.

- Most motor vehicle fluids are combustible.

c. Any possibility of fire.

-Emphasize the danger of using flares or fusees if there is ANY possibility of fire.

- In these cases, the only safe warning devices are reflectors. The large, red-orange triangles are especially effective. Of course, the vehicle's lights (e.g., beacon, four-ways) can be used as well.

4. Replace any warning devices that are used as soon as the EV returns to quarters.

* * END OF MODULE 3 * *

Review Exercises

1. Indicate which of the following statements are true and which are false.

		T	F
a.	More than half of all fatal accidents occur at night.	x	
b.	Generally, older people's eyes function just as well as younger people's eyes when it comes to night driving.		x
c.	It is a good idea to have instrument panel lights as bright as possible at night.		x
d.	The roadway is usually most slippery when it has just begun to rain.	x	
e.	It is a good idea to go through large areas of water as quickly as possible, so that the vehicle is exposed to its effects for the shortest possible time.		x
f.	The farther below freezing the temperature drops, the more hazardous the ice or snow on the road will be.		x
g.	When driving in fog avoid the use of high beams.	x	

2. Some of the items listed below are less likely than the others to cause personal injury and property damage if struck in a collision because they are impact-absorbing. Circle the letters beside the items that are impact-absorbing.

[✓ a.] Road sign (speed limit, stop sign)

b. Telephone pole

[✓ c.] Low bushes and shrubs

[✓ d.] Parked cars

e. Concrete bridge abutment

[✓ f.] Chain-link fence

g. Full-size oak tree

3. What are the three primary steps that can be taken to help control a skid?

   -Stay off brake
   -Stay off accelerator
   -Countersteer

4. Indicate which of the following statements relating to off-road recovery are true, and which are false.

		T	F
a.	If your wheels go off the road edge while traveling at high speed, pump-braking is a good way to reduce speed.		*x*
b.	If possible, it is a good idea to reduce speed to about 15 mph before attempting to steer back onto the roadway.	*x*	
c.	If you do not have time to decelerate (because of an obstacle ahead) you can steer the vehicle sharply toward the road edge (about 90°) to effect an off-road recovery.	*x*	
d.	You should attempt to steer onto the road at the place where there is the least difference between road edge and berm.	*x*	
e.	As soon as all four wheels are back on the roadway, you should countersteer to control your lane position.		*x*

5. Describe, for any five (5) of the following malfunctions, the appropriate procedure for handling the malfunction.

   a. Brake failure: *Shift to lowest gear; apply parking brake; avoid locking wheels; pump brake pedal rapidly.*

   b. Accelerator sticks: *Attempt to release using tip of foot; if unsuccessful, put vehicle in neutral and turn engine off.*

   c. Engine temperature rises into danger zone: *Stop vehicle immediately; do not drive until maintenance has been performed.*

   d. Transmission failure: *Select off-road stopping place; brake gradually to a stop.*

   e. Blowout: *Do not brake or accelerate; maintain steering control (may be difficult); when steering is controlled, brake gradually.*

   f. Hood flies up: *Try to see through gap, or put head out side window, pull to side of road without sudden braking.*

6. When the EV is at the side of the road, EV operators could use any one or a combination of the following to warn/alert motorists. On the list below, mark the most effective way with the letter "M" and mark the least effective way with the letter "L".

___ Headlights

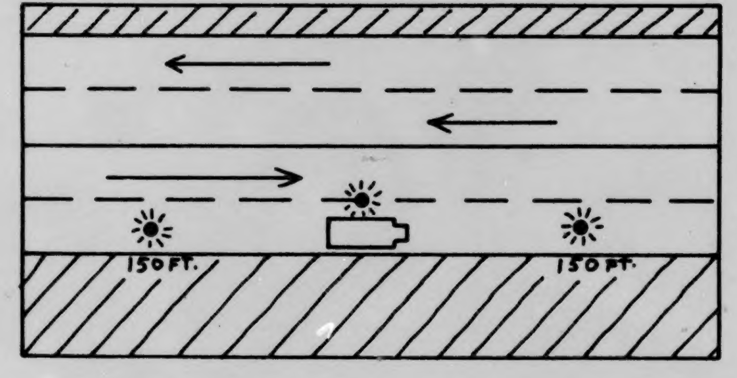
___ Four-way flashers

M Triangles

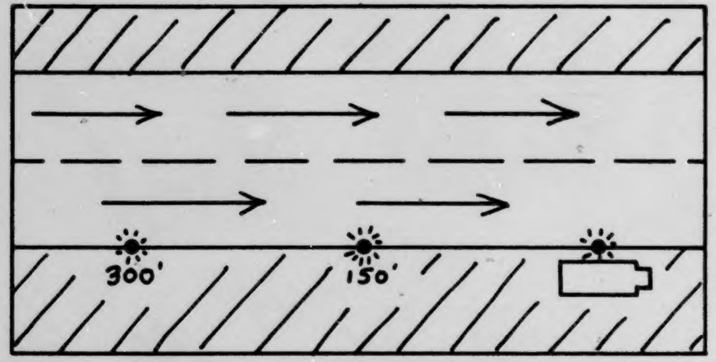
___ Overhead beacon

L Parking lights

7. On the two drawings below, indicate with Xs the correct placement of warning devices (e.g., reflectors, flares).



On-road, two-way traffic flow.



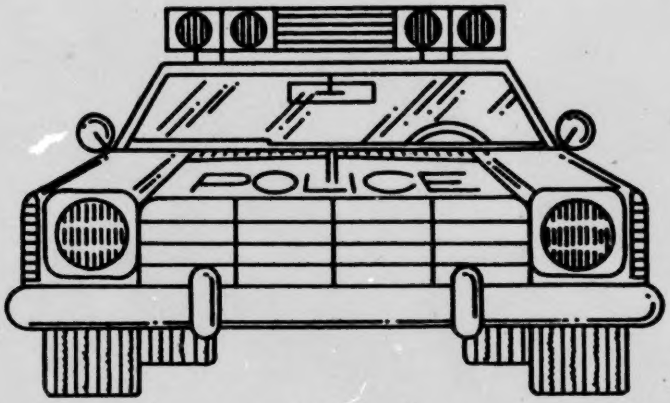
Off-road, divided highway.

Training Program for Operation of Emergency Vehicles

PART II: Specialized Unit

Operation of Law Enforcement Vehicles

INSTRUCTOR LESSON PLANS



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Description of Unit

This unit covers the areas of emergency vehicle operation that are especially relevant to operators of law enforcement vehicles.

Module 1 - 30-45 Minutes

1. INTRODUCTION. Some background on the law-enforcement traffic-accident picture and a brief overview of unit content.
2. COMMUNICATIONS. Brief review of some of the points covered in Unit C, and presentation of information and techniques specifically relevant to law enforcement vehicle operators.
3. PURSUIT DRIVING. The Risks of Pursuit. Background on the kinds of situations and conditions that contribute to the risk of pursuit.
4. Types of Pursuit. Information about the different types of violators, hazardous and non-hazardous.
5. Using Lights and Siren in Pursuit. Information about the legal requirements for lights and siren in pursuit, as well as techniques for use of lights and siren during pursuit.
6. When Should Pursuit be Abandoned? General guidelines, which should incorporate local or departmental policy (see instructor preparation activities) that can help a law enforcement officer decide when the risks of pursuit outweigh the possible good.

Module 2 - 30-45 Minutes

1. PURSUIT DRIVING TECHNIQUES. Specific techniques and procedures that will contribute to controlled, safe pursuit driving.

Description of Unit (Continued)

2. MAKING A TRAFFIC STOP. Procedures and techniques for making a routine traffic stop. Procedures for making hazardous-violator stops are NOT included, but can be presented according to local or departmental policy.

3. If the EV Overshoots the Violator's Vehicle. Procedures for dealing with the situation of the officer being forced to pull in front of the violator's vehicle.

4. EMERGENCY ESCORT OF ANOTHER VEHICLE. Guidelines for determining if escort should be provided, including some possible alternatives to providing escort.

5. How to Escort. Procedures and techniques for handling an escort situation.

Review Exercises - 20-30 Minutes

Written review questions on the material presented in this unit. Time estimate allows for explanation and discussion after the trainees have completed the exercises.

Trainees' Knowledge Objectives

Module 1

By the end of this module, the trainees:

1. Will be able to list three items of identifying data that should be transmitted to the dispatcher whenever a suspect or violator is spotted.

2. Will be able to write a brief description of the effects of "tunnel vision" and "adrenalin kick."

3. Given a listing of several types of offenders, will be able to identify which fall into the hazardous violator group.

4. Will be able to state two reasons why a pursuit might be abandoned.

Module 2

By the end of this module, the trainees:

1. Given a list of several statements about pursuit driving, will be able to select those which are correct.

2. Given a drawing illustrating several police vehicles and a violator's vehicle, will be able to select the police vehicle that is in the correct position for making a routine traffic stop.

3. Will be able to state whether or not emergency escort of another vehicle is permitted in the department in which they will be working. If escort is permitted, the trainees will state under what circumstances it is permitted.

4. Given a description of two situations, will be able to indicate whether or not it would be appropriate to provide escort, and explain why.

Instructor Preparation Activities

Module 1

1. Read over the entire module and be prepared to present a lecture on those materials.
2. Preparation for II-P-15. Find out exactly what the state statutes say about using lights and siren in pursuit. Be prepared to present that information in class.
3. Preparation for II-P-16. Find out what the state laws say about use of high beams. Be prepared to present that information in class.
4. Preparation for II-P-16. If possible, obtain any copies of local or departmental policies re: pursuit and/or abandoning pursuit. Make enough copies for all trainees, and be prepared to pass them out and discuss them in class.

Equipment: Chalkboard and chalk.

Materials: Enough copies of any local or departmental policies re: pursuit for all trainees.

Module 2

1. Read over the entire module and be prepared to present a lecture on those materials.
2. Preparation for II-P-24. Check to see if emergency escorting is permitted in the department in which the trainees will be working. If it is NOT permitted, do not present any of those materials.
3. Preparation for II-P-24. Check to see if the second point listed under C conflicts with local or departmental policy. If it does conflict, cross it out so that you will NOT present it to the class.

Instructor Preparation Activities (Continued)

Equipment: Chalkboard and chalk.

Materials: None

Review Exercises

Question 7 does not include the answer because it is dependent on local departmental policy. If emergency escort is permitted, write a brief description of the conditions.

Additional Recource Documents:

Bibliography and reference nos.: 8, 9, 10, 13, 15, 21, 28, 32, 43, 44, 45, 61.

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES

INTRODUCTION

- Lead a class discussion about the following items of information:

- The national police vehicle accident rate is 2.5 times as high (per vehicle mile) as the accident rate for other professional drivers (e.g., traveling salesmen).
- Far more law enforcement officers are killed in traffic accidents than by gunshot wounds or other violent means.

A. Most law enforcement officers spend approximately two-thirds of their on-duty time behind the wheel of a vehicle. It is therefore, critical that they have enough knowledge about the vehicle, and practice behind the wheel of a vehicle, to be able to make quick, accurate decisions when the need arises.

B. The public depends on law enforcement officers to set an example. It is important that law enforcement officers, especially in times of stress, maintain control of themselves, their vehicles, and the situation.

C. In this unit, material will be presented on topics that are of special importance to law enforcement officers. The topics include:

1. Communications.
2. Pursuit driving.
3. Making a traffic stop.
4. Emergency escort of another vehicle.

NOTES

* * * BEGIN MODULE 1 * * *

TSG - II-P-2

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES	NOTES
COMMUNICATIONS	TSG - II-P-3

COMMUNICATIONS

To a large extent, the safety of the general public, as well as the safety of the law enforcement officer, rests upon effective communications. Every officer should know the communications principles listed below and follow them without fail--they could save a life.

A. Communications should be as brief as possible, without sacrificing accuracy.

- It is important not to tie up the communications lines with irrelevant details.

B. Whenever a suspect or violator is spotted, identifying data should be transmitted to the dispatcher or communications center at once.

-Ask the trainees for examples of identifying data.

- License plate number, and/or
- Make, model, year, and color of vehicle.
- Number of passengers.
- Description of violator (if possible).
- Any other identifying characteristics of the vehicle (e.g., broken taillight, dents).

-Tell the trainees that the last three items become increasingly important if the license plate is not visible.

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES	NOTES
C. Whenever an officer becomes engaged in a high-speed chase (pursuit) he should notify the dispatcher of his position, and keep the dispatcher abreast of his position as it changes.	TSG - II-P-3

C. Whenever an officer becomes engaged in a high-speed chase (pursuit) he should notify the dispatcher of his position, and keep the dispatcher abreast of his position as it changes.

- This action could save the officer's life.

- If there is a second officer present, he should conduct communications.

-Point out the dangers of trying to drive at high speed while using one hand to operate the communications equipment.

- If the officer must conduct communications himself, he should pick a time when he is not likely to need both hands on the steering wheel to maintain control (e.g., on a straight stretch of road).

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES | **NOTES**

PURSUIT DRIVING

TSG - II-P-4

Almost all police departments have established policies or guidelines that deal with pursuit driving and the apprehension of suspects or violators. Sometimes these policies are not formally written down. A law enforcement officer who is new to his job must find out what local or departmental policies are in effect.

The Risks of Pursuit Driving

- Nearly 50 percent of all pursuit or high-speed chases end up with one or more of the vehicles involved in a collision--a very high percentage of these accidents involve loss of life.

Pursuit driving, at best, is a risky business. Law enforcement officers should be aware of the factors that increase the risk.

A. Speed represents the single greatest contributor to risk during pursuit driving. The greater the speed:

1. The less time the driver has to identify hazards and take appropriate action.
2. The longer the stopping distance.
3. The greater the chance of skidding or rolling over on a turn.
4. The greater the danger in the event of a vehicle malfunction.

-Discuss what the effects of a blowout at 80 mph might be.

5. The greater the probability of personal injury and property damage in a collision.

TSG - II-P-4

6. The greater the force of impact in a collision.

-*Point out to the trainees:*

- The average man walks at about 3 mph. If a man walks into a wall or a door, he can break his nose quite easily.
- Safety belts will reduce the number and the impact of in-vehicle collisions (e.g., head and windshield, chest and steering wheel, knees and instrument panel).

B. The Violator, attempting to flee from a police officer, regardless of the violation or suspected violation, is committing a crime. People who are fleeing from police act in unpredictable (and unsafe) ways:

TSG - II-P-5

1. A fleeing violator often has no concern for his own safety.
    - Or, consequently, for the safety of other persons.
2. He will perform dangerous maneuvers if he thinks they will enhance his chances of escape.

-*Ask the trainees what kind of dangerous maneuvers a fleeing violator might try. Include at least the following:*

- He may delibertly run people off the road.
- He may delibertly attempt to cause the pursuing officer to have a collision.

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES | **NOTES**

C. Other Motorists often react unpredictably to the sound of sirens or to confusion in general.

TSG - II-P-5

-Ask the trainees what kinds of unpredictable actions other motorists might take. Include at least the following:

- They may not yield, or clear a path.
- They may swerve suddenly in an attempt to clear a path.
- They may jam on their brakes with disasterous results.

D. Heavy Traffic and congested roads increase the risk of mishap. The more vehicles the officer must pass from the beginning to the end of the pursuit, the greater the chance that the pursuit will end in a collision.

- Intersection accidents represent nearly 50 percent of all EV accidents. Pursuit on roads that have many intersecting roads, and consequently cross-traffic, greatly increases risk.

E. Poor Environmental Conditions greatly increase the chance of mishap.

-Ask the trainees to name some poor environmental conditions. Include at least the following:

- Restricted visibility (fog, heavy rain, darkness, twilight).
- Slippery road surfaces (snow, ice, water, leaves, oil).
- Poor road condition (ruts, potholes, no lane markings, soft shoulders).

F. The Pursuing Officer's Condition can influence the amount of risk involved in a pursuit. Every officer should recognize that the following conditions increase the risk of mishap:

POL

1. Fatigue.

TSG - II-P-5

-Point out that fatigue can cause drivers to make faulty judgments (e.g., stopping distances) as well as:

- Slow reactions.
- Impair coordination.
- Impair vision.

2. Impaired vision (for any reason).

3. Drug side-effects (prescription or nonprescription).

- Drowsiness.
- Impaired coordination.
- Nervousness.

-Point out that any officer who is taking any kind of medication should be alert for undesirable side effects.

4. Mental or emotional condition. Being upset about personal problems or "shaken" due to a recent emergency can impair judgment.

5. Undesirable physical effects can be brought about by the act of pursuit. Some include:

   a. Tunnel vision. As speed is increased, the visual field narrows. Consequently, high speed limits peripheral vision.

TSG - II-P-6

   - Objects on the side of the road will appear as blurs (those blurs could be pedestrians).

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES	NOTES
b. Adrenalin kick. The excitement and danger of high speed driving often causes an excessive amount of adrenalin to flow into the blood. This excess adrenalin can have two effects:	TSG - II-P-6

1) An expansion of the time-speed sense. Events are slowed down in the driver's mind.

- When the operator slows to 70 MPH after traveling 90 mph, he may feel as though he is moving only at 50 mph. Check the speedometer; especially when returning to normal speeds.
- If the pursued vehicle spins out, it may appear to be spinning in slow motion.

2) An extreme sense of confidence. The adrenalin's effect often causes an officer to become overconfident in his driving ability or his vehicle's maneuverability. Officers should be alert for this kind of feeling.

- Otherwise cautious drivers will take foolish chances when feeling overconfident.

-Discuss the following:

- Many veteran police officers report that the siren sound contributes to the feeling of excitement, urgency, and overconfidence. Additionally, the siren makes it difficult to concentrate on the driving tasks, or use the radio.

Types of Pursuit

TSG - II-P-6

A. Hazardous Violator.

- Included in this group are:
    - Felons.
    - Drunks.
    - Reckless drivers.
    - Speeders.

1. Pursuit of such violators introduces a high degree of risk.
    - The risk should NEVER extend to the point that the officer abandons due regard for the safety of others.
2. This type of violator will have little (if any) concern for the safety of others.
3. Pursuit of this type of violator requires skill, good judgment, discretion, and persistence.

B. Nonhazardous Violator.

- Included in this group are:
    - Non-moving violations.
    - Less serious moving violations.
    - Equipment defects.

1. The actions of this type of violator are often made more hazardous by the act of pursuit.

2. Pursuit of voilators who have not committed a hazardous violation does not merit excessive speed in chase, and the associated risk to the pursuing officer and the motoring public.

    - The officer should obtain the license plate number or radio ahead to another EV to facilitate apprehension at a later time.

TSG - II-P-7

-Point out that in any pursuit it is a good idea to radio ahead.

Using Lights and Siren in Pursuit

The use of emergency signaling equipment when traveling over the speed limit is MANDATORY. Additionally, the use of signaling equipment provides the officer with some degree of protection from a legal viewpoint, should he become involved in a collision. Using signaling equipment, however, does NOT relieve an officer from the duty to exercise due regard for the safety of all persons.

A. To be maximally effective, the siren should be turned off for very brief periods to vary the pitch.

    - Review material from Part I.

-Be sure to tell trainees if A, above, does not conform to state law.

B. The warning effect of the siren will decrease rapidly as vehicle speed increases.

    - At 90 mph (132 feet per second) the warning effect may be reduced almost to zero.

    - The kind of sound most likely to be heard is one which fluctuates.

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES	**NOTES**
C. At night, high beams should be used every moment legally possible.	TSG - II-P-7
-Tell the trainees what the state laws say about use of high beams.	
When Should Pursuit Be Abandoned?	
A. It is impossible to present exact guidelines indicating when to abandon pursuit. To a large extent, the decision of whether of not to begin or abandon pursuit must be based on each individual case.	
-If you have access to the policies of the department for which the trainees will be working, present them at this time. If this is not possible, remind the trainees they should find out what the policies are, once on the job.	
"To some police officers abandoning pursuit is unthinkable and often mistakenly thought to be cowardly. But the well-trained, well-disciplined police officer is aware that the decision to abandon pursuit is, under certain circumstances, the most intelligent course of action."*	
B. Don't ignore the cues. The following are good reasons to abandon pursuit:	TSG - II-P-8
1. If an officer begins to suspect that he is nervous, shaky, or frightened.	

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INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES	NOTES
2. If an officer begins to suspect the vehicle has a malfunction. 3. When traffic conditions are such that the risk to the public is great (violation of due regard). 4. If an officer believes the actions of the violator are being made more hazardous by the act of pursuit.	TSG - II-P-8

* * END OF MODULE 1 * *

PURSUIT DRIVING TECHNIQUES

A. Learn the territory.

- Location of sharp curves.
- Blind intersections.
- Stop signs, etc.

B. Keep the dispatcher informed of position and progress.

-Emphasize and explain the importance of points A and B above.

C. Keep wheels well away from pavement edges.

- A wheel off the road, or a damaged road edge could cause loss of control.

D. Don't brake heavily and attempt to change the direction of the vehicle at the same time.

- At high speed, this is certain to cause a skid, and perhaps an uncontrollable broadside slide.

E. Do not follow the violator too closely; move up only when ready to apprehend.

- Since the intentions of the violator are unknown, following too closely can have disasterous results:
  - If the violator collides with something, the pursuing officer may not have time to take evasive action.
  - The violator could jam on his brakes (causing the officer to collide with the violator).

* * * BEGIN MODULE 2 * * *

TSG - II-P-9

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES	NOTES
•The violator could make a sudden turn.	TSG - II-P-9

F. If the pursuing officer must go through red lights and stop signals, he MUST slow enough to ensure that no motorist or pedestrian will be endangered.

G. The pursuing officer should not travel at high speed in opposing lanes of traffic.

H. Don't join a pursuit that already has two or more pursuing vehicles, unless specifically ordered to do so by a superior.

-Discuss the dangers of multiple EV pursuits. If there are any local or departmental policies on this subject, present them now.

I. Never attempt to ram or "nudge" the violator's vehicle with the emergency vehicle.

J. Avoid pulling directly beside or in front of the violator's vehicle.

- This provides an excellent opportunity for the violator to ram the EV.

K. Select a safe stopping place.

-Ask the trainees what constitutes a "safe" stopping place.

- Away from intersections.
- Away from hill crests.
- Off the roadway.

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES | **NOTES**

MAKING A TRAFFIC STOP

TSG - II-P-10

The procedures presented in this module are those for making a routine traffic stop. Procedures for stopping hazardous violators should be made according to departmental policy.

A. Avoid stopping motorists on high-speed highways, unless both vehicles can be entirely removed from the roadway.

B. Position the EV to the rear of the violator's vehicle, in the same lane of traffic.

C. Shorten the gap between the EV and violator and signal the motorist to stop.

- Siren should be used only as a last resort--motorists will often become confused and/or hit the brakes.
- Instead, use horn, hand signal, headlights, emergency lights, and/or PA system.

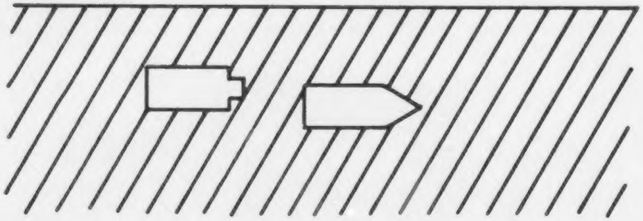
D. Choose the location for the stop. Be sure contact with the violator is made far enough in advance for him to reach it.

E. Once ascertaining that the motorist is aware and intends to stop, signal for right turn, and assist violator in moving over lane by lane.

F. Pull completely off the road; park approximately six feet to the rear and three feet to the left of the violator's vehicle.

- EV operator should be far enough back to read violator's license plate.
- Operator should notify dispatcher before leaving vehicle.

POI

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES	NOTES
	TSG - II-P-10
-Explain to the trainees how this parking position will afford the officer protection.	
If the EV Overshoots the Violator's Vehicle	TSG - II-P-11
Occasionally, due to traffic conditions or faulty maneuvering, the EV operator will be forced to pull in front of a violator.	
•A police officer should NEVER approach a suspicious or dangerous person from the front.	
If this occurs, the officer should:	
A. Signal the motorist to pull his vehicle up, in front of the EV, if at all possible.	
•EV's engine should be kept running until violator's vehicle is parked with ignition off.	
B. If there is not sufficient room for the violator to pull in front of the EV, the officer should motion the violator to meet him at the rear of the EV, provided that neither the officer or the violator will compromise their safety by doing so.	

UNIT TITLE	OPERATION OF LAW ENFORCEMENT VEHICLES	**UNIT PAGE**	II-P-22

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES	**NOTES**
- *Strongly emphasize the following point:* - If conditions seem at all unusual or suspicious, operator should radio for a back-up unit immediately!	TSG - II-P-11

POL

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES | **NOTES**

EMERGENCY ESCORT OF ANOTHER VEHICLE

TSG - II-P-12

A. Emergency escort represents a dangerous situation. Some of the reasons are:

1. The EV operator does not know the other vehicle's handling characteristics or what the other driver's capabilities are.

2. In general, when traveling through intersections, the motoring public assumes the EV is alone.

    - For this reason, when providing escort EV operators should come to a complete stop at all red lights and stop signals, whether or not emergency signaling equipment is in use.

B. An EV operator should not escort another vehicle unless it is a life-threatening emergency, or unless specifically instructed to do so by a superior.

C. There are several good alternatives to providing escort.

- If a person in the other vehicle is critically injured, and the driver is not fit (mentally or physically) to operate the vehicle, call the dispatcher and request an ambulance or rescue unit.

-If the following point conflicts with departmental or local policy do not present it.

- If the injured person is not too seriously injured to be moved, transfer the person to the police vehicle.

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES | **NOTES**

How to Escort

TSG - II-P-12

If, based on the guidelines listed on the previous page, the EV operator determines the best course of action is to provide escort, these procedures should be followed:

A. Establish a procedure with the other driver.

- How closely to follow.
- Approximate speed.
- What route to follow.

B. The EV should lead the other vehicle.

- This will enable the EV operator to control the speed.
- This will ensure that the other vehicle stops for red lights and stop signals.

C. Use emergency signaling equipment as required by state or local law.

-Emphasize the following:

- If the other vehicle is involved in a collision while the EV is providing escort, the EV operator can be held criminally or civilly liable.

D. NEVER travel the wrong way down a one-way street or in opposing lanes of traffic with another vehicle following.

E. Avoid traveling at speeds in excess of the limit.

TSG - II-P-13

- The driver of the other vehicle is probably not a "professional" driver; also, he is probably under a lot of stress.

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES	NOTES
F. Radio ahead to the destination so they will be prepared for arrival. • If impossible or impractical, contact the dispatcher and request that he telephone.	TSG - II-P-13

* * END OF MODULE 2 * *

Review Exercises

1. There are several items of identifying data that should be transmitted to the dispatcher whenever a suspect or violator is spotted. List three of those items below.

-License plate number.

-Make, model, year, and color of vehicle.

-Other identifying characteristics (e.g., dents).

-Number of passengers.

-Description of violator.

2. Write a brief description of the following conditions:

Tunnel vision: *Limited peripheral vision, objects on the side of the road may appear as blurs.*

Adrenalin kick: *General excitement and feeling of urgency. Expansion of the time-speed sense. Overconfidence.*

3. Several of the offenders in the list below are considered hazardous violators; circle the letter in front of those that would be considered hazardous violators.

a. A driver who has gone through a stop sign, without coming to a full stop.

[✓ b.] A driver going 60 mph in a 45 mph zone.

[✓ c.] A driver who is operating the vehicle in a reckless manner.

d. A driver whose vehicle has a burned-out headlight.

e. A violator who has just pulled out of a parking space beside a fire hydrant.

4. There are many reasons why a pursuit might be abandoned. List two of them below.

-If an officer is nervous, frightened, or shaky.

-If an officer suspects the vehicle has a malfunction.

-If traffic conditions are such that the risk to the public is great.

-If the actions of the violator are being made more hazardous by the act of pursuit.

5. Below are several statements about pursuit driving. Circle the letter in front of those statements that are correct.

a. If traffic is light, you do not need to use the siren during pursuit.

b. When pursuing a violator, you should follow him closely to avoid having him escape.

[✓ c.] About 50 percent of all pursuits end in a collision.

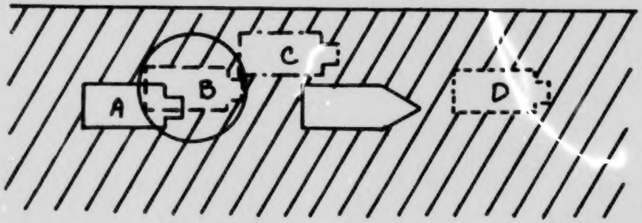
d. The single greatest risk in pursuit driving is the unpredictable behavior of other motorists.

[✓ e.] A pursuing officer should not travel in opposing lanes of traffic at high speed.

f. A law enforcement officer who is pursuing a dangerous, known felon, should always pursue until the violator is apprehended.

[✓ g.] You should not join a pursuit that already has two or more pursuing vehicles.

6. The lettered vehicles below represent possible parking positions for making a traffic stop. Circle the letter that represents the vehicle that is parked in the correct (safest) position.



7. If emergency escort of another vehicle is permitted in your department, write a brief description of the conditions under which it is permitted. If escort is not permitted, write nothing.

8. For each of the situations listed below, indicate whether or not it would be appropriate to provide escort, and explain your answer.

   a. You have just pulled over a car that has run through a red light. The driver, a woman, explains that she must get to the hospital quickly because her young son, who is in the back seat, has apparently broken his wrist.

      -Escort should not be provided in this situation. A possible broken wrist is not likely to be a life-threatening situation. It would be safer for all concerned if the boy and his mother were transported to the hospital in the police vehicle if local or departmental policy permits. If local policy forbids transporting injured persons in the police vehicle, the officer should contact the dispatcher and request an ambulance.

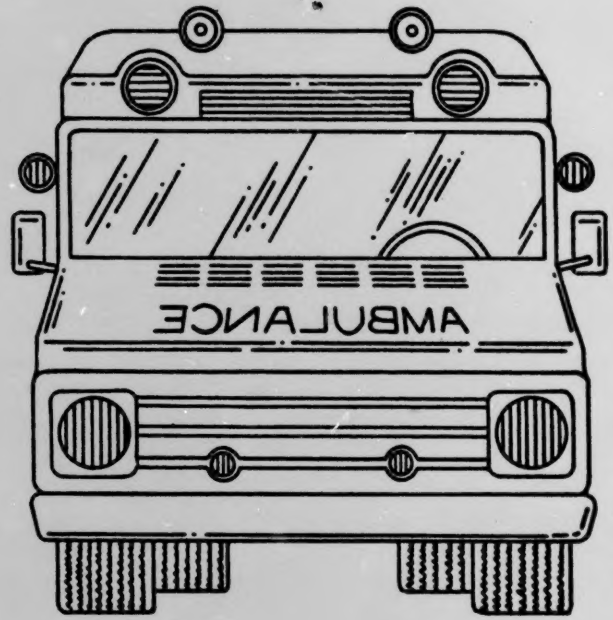
   b. You have just stopped to check a vehicle that was pulled off the expressway. The driver, an elderly man, explains his wife seems to have had a heart attack, she is unconscious.

      -It would be appropriate to provide escort in this situation since the woman is elderly and unconscious, and may have had a heart attack, this is more than likely a life-threatening emergency. It would not be wise to move the woman to the police vehicle.

Training Program for Operation of Emergency Vehicles

PART II: Specialized Unit Operation of EMT/Ambulances

INSTRUCTOR LESSON PLANS



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PART II - OPERATION OF AMBULANCES

Description of Unit II-A-1
Trainees' Knowledge Objectives II-A-2
Instructor Preparation Activities II-A-3
  Introduction II-A-4
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  Inspection and Maintenance II-A-6
  Operation of the Ambulance II-A-8
  Review Exercises II-A-14

Description of Unit

This unit covers the areas of emergency vehicle operation that are especially relevant to operators of ambulances or rescue vehicles.

Module 1 - 90 Minutes

1. INTRODUCTION. Brief overview of unit content.
2. ROUTE PLANNING. Expansion of material covered in Unit C (Selecting Routes).
3. INSPECTION AND MAINTENANCE. Emphasis on inspection and maintenance of medical and life-support equipment. A checklist is provided.
4. OPERATION OF THE AMBULANCE. Driving to the victim. Covers techniques and procedures for driving to a victim, from the dispatcher's call to arrival.
5. At the Scene. Covers special parking considerations and directing traffic. Does NOT include any medical information.
6. Driving With a Patient Aboard. Describes the rationale and procedures for providing safe, efficient transport.

Review Exercises - 20 Minutes

Written review questions on the material presented in this unit. Time estimate allows for explanation and discussion after the trainees have completed the exercises.

Trainees' Knowledge Objectives

Module 1

By the end of this module, the trainees:

1. Given a list of statements relating to driving to a victim, will be able to identify those that are correct.
2. Will be able to list two reasons why it is not advisable to drive in the emergency mode with a patient aboard.
3. Will be able to name two medical conditions that indicate especially smooth, low-speed transport is required.
4. Will be able to name two conditions that indicate emergency mode transport is required.

Instructor Preparation Activities

Module 1

1. Read over the entire module and be prepared to present a lecture on those materials.
2. Preparation for II-A-6. If possible, obtain the medical supplies and life-support equipment checklist that the trainees will be using on the job. Make enough copies for all trainees, and substitute it for the checklist that appears on page II-A-7.
3. Preparation for II-A-8. Compare the information presented in point C with the statutes in your state. Present any additional information found in the statutes to the class at this time.
4. Preparation for II-A-9. If possible, find out the specific dimensions of the vehicles the trainees will be operating on the job.

Equipment: Chalkboard and chalk.

Materials: Enough copies of medical supplies and life-support equipment checklists for all trainees.

Additional Resource Documents: Bibliography and reference nos.: 2, 40, 46.

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES

INTRODUCTION

A. An ambulance operator's primary responsibility is the safe transport of the sick and injured. Safe means:

1. Not risking an accident.

2. Smooth driving:

   a. Driving that will not stress or traumatize the patient.

   b. Driving in a manner that will permit the crew to provide medical care to the patient.

B. No medical emergency, however severe, justifies driving in a manner that risks loss of control of the vehicle or that relies on the operators of other vehicles or pedestrians to react ideally.

C. The topics that will be covered in the remainder of this unit include:

1. Route planning.

2. Inspection and maintenance.

3. Operation of the ambulance.

   a. Driving to the victim.

   b. Responsibilities at the scene.

   c. Driving with a patient aboard.

NOTES

* * * BEGIN MODULE 1 * * *

TSG - II-A-2

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES

NOTES

ROUTE PLANNING

TSG - II-A-3

A. For ambulances operating from a fixed base, it is particularly important to plan in advance the various routes the ambulance is likely to travel. Advance planning usually takes the form of a "Routing Plan."

1. Divide the area into sections.
2. Be based on test runs over selected routes at various times of day and night.
   - Test runs should be made in a passenger car (if possible). If an ambulance is used, NEVER use emergency signaling equipment; it is ILLEGAL.
   - Pinpoint times of heavy traffic congestion.
   - Locate less congested, alternate routes.
3. Be updated at regular intervals.
   - Reroutings are sometimes necessary due to construction, detours, etc.

B. Drivers should always inform the dispatcher of any new conditions about the area (e.g., detours). This information can also be put in a trip report.

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES	NOTES
INSPECTION AND MAINTENANCE	TSG - II-A-4

INSPECTION AND MAINTENANCE

A. The vehicle inspection and maintenance activities presented in Part I of the course apply directly to ambulances.

B. Additionally, the driver or an attendant should inspect the vehicle's medical supplies and life-support equipment daily.

- Checklist should be used to ensure that equipment is inspected.

–If you have access to a medical supply and life-support equipment checklist that the trainees will use on the job, substitute it for the one that appears on the following page.

EQUIPMENT CHECKLIST

Medical

	OK	LOW	REPLACED
Medical			
Pillows			
Blanks & Sheets			
Portable suction apparatus			
Bag-mask ventilation unit			
a. Adult mask			
b. Child mask			
C. Infant mask			
Oropharyngeal airways			
a. Adult			
b. Child			
c. Infant			
Mouth to mouth airways			
a. Adult			
b. Child			
Oxygen equipment, tubing & masks			
a. Adult			
b. Child			
c. Infant			
Mouth gags and tongue blades			
Universal dressings			
Sterile gauze pads			

	OK	LOW	REPLACED
Soft roller self-adhering bandages			
Aluminum foil, sterile & wrapped			
Adhesive tape			
Burn sheets			
Traction splint, limb-support slings, ankle hitch and traction strap			
Inflatable splints			
Spine boards with accessories			
a. Short			
b. Long			
Triangular bandages			
Large-size safety pins			
Shears for bandages			
Sterile obstetrical kit			
Poison kit			
Blood pressure manometer, cuff, and stethoscope			
Compartmentalized pneumatic trousers with inflation equipment			

Other

Fire extinguishing equipment			
Two-way radio for direct hospital communication			
Warning devices			
-triangular reflectors			
-battery operated flares			
Telementry equipment			
Extrication equipment			
Wrench			
Screwdriver			
Screwdriver - Phillips			
Hacksaw - (carbide) blades			
Pliers			
Hammer			

Fire Axe			
Wrecking bar			
Crowbar			
Bolt cutter			
Power jack & spreader tool			
Shovel			
Tin snip			
Two 50' manila ropes - 3/4" diameter			
Hard hat			
Safety goggles			
15' Rated chain with grab hook & running hook			

Remarks: ____________________

Driver: ____________________ Date: ____________________
Supervisor: ____________________ Date: ____________________

AMB

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES	NOTES
OPERATION OF THE AMBULANCE	TSG - II-A-6

OPERATION OF THE AMBULANCE

Driving to the Patient

A. When an ambulance operator receives a call from the dispatcher, he must obtain all relevant information.

- Especially important is the dispatcher's preliminary assessment of whether or not the condition is a true emergency.

-Review the points that were taught in Unit C.

- Description of emergency.
- Address (location) and other identifiers.
- Indication of priority.

B. The operator should drive to the scene with all due speed consistent with safe arrival.

- Proper use of lights and siren is essential.
- The operator must never drive so fast that vehicle control is compromised.
- Routine transports are not considered true medical emergencies.

C. All ambulances should come to a full stop at red lights, stop signs, and railroad crossings, regardless of the nature of the emergency.

-Tell the trainees what the laws in this state stipulate.

D. Generally, the basic and emergency mode operation techniques presented in Part I apply to ambulances. There is, however, an additional consideration, vehicle dynamics. Ambulances

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INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES | **NOTES**

are larger than sedans (heavier, higher). Therefore, due to vehicle dynamics:

TSG - II-A-6

1. Be particularly aware of (and careful on) decreasing radius curves.
2. Following distance should be increased.
   - Larger, heavier vehicles have greater stopping distances than sedans.

-If you know the specifics of the type of ambulance the trainees will drive, present a comparison of the dimensions of an ambulance to an ordinary sedan and a description of the effects of a high center of gravity.

At the Scene

A. Parking Considerations.

1. Ambulance should be positioned for most convenient access to victim or patient.
2. Ambulance should be positioned to minimize disruption to any traffic.
   - Ambulance should be protected from damage.
3. Special care should be exercised when parking on hills.

TSG - II-A-7

   - Always set the parking brake.
   - Beware of stretchers that can roll.

4. If more than one ambulance is at the scene, they should be parked in the head-and-taillight position (ladder), if possible.

TSG - II-A-7

-Draw a simple illustration of this technique on the chalkboard.

CHALKBOARD

- This technique is most effective on the highway or in rural areas.

B. Directing traffic. If police have not arrived at the scene, the operator may need to direct traffic or assign someone at the scene to do so.

- This can be very important for avoiding further injuries.
- If it is safe to do so, flares or reflectors should be placed as soon as possible.

C. Ambulance should not leave the scene until:

1. Patient is secured.
2. All doors are closed and locked.
3. Crew gives an audible "okay" (indicating all are present and prepared).

Driving With a Patient Aboard

A. A high-speed transport, with its associated sudden starts and stops, can:

1. Frighten the patient.
2. Put a stabilized patient into shock.

3. Disrupt ongoing medical treatment.

TSG - II-A-7

-Emphasize the following point:

4. Aggravate certain medical conditions sufficiently to cause DEATH OR PERMANENT DISABILITY TO THE PATIENT.

   •Spinal injuries, serious fractures, and heart attacks are examples of such injuries.

B. In almost all cases, the transport should be conducted:

TSG - II-A-8

1. At speeds below the legal limit.
2. With headlights on.
3. With emergency lights on.
4. With siren OFF.

   •Except in the rare case when exemptions will be exercised (e.g., traveling over the legal limit).

5. Obeying all stop signals and red lights.
6. Coming to a FULL STOP at all railroad crossings.

C. There are certain medical conditions that may require "emergency mode" transport.

•These "emergency mode" transports only constitute about five to seven percent of the total.

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES	**NOTES**
D. These conditions include:	TSG - II-A-8

D. These conditions include:

1. Uncontrolled hemmorhage.
    - Such as internal bleeding in chest or abdomen.
2. Uncontrolled cardiovascular or respiratory impairment.
    - Such as congestive heart failure, wounds of the heart, or progressive pulmonary edema.
3. Complicated impending childbirth.
    - Any case in which operative intervention is required.

-Discuss the following:

- In any of the above cases, the ambulance should proceed to the hospital as quickly as possible, however:
    - Due regard for the safety of others must be exercised.
    - The ambulance should still come to a full stop for red lights, stop signals, and railroad crossings.

-Allow the trainees a few minutes to read over the article on the following page. When they have finished, conduct a brief discussion based on the article.

* * END OF MODULE 1 * *

A TRAGIC CASE OF TOO MUCH SPEED*

About 4 am Indian Rocks Beach Fire Department emergency medical technicians were sent to the Frank Utnage residence to treat a possible heart attach. Two firefighters, David Crane and Lt. James Terry, were the initial respondents to the call. Michael Signorelli, an off-duty firefighter, also responded because he lived two blocks from the Utnage residence.

The two men started cardio pulmonary resuscitation on Utnage and prepared him for transport to a nearby hospital. The ambulance arrived and Signorelli volunteered to go to the hospital with the ambulance crew.

Leaving for the hospital at a high rate of speed, the ambulance was followed by Utnage's wife and son-in-law, Bob LaDisa. To keep up with the ambulance, LaDisa had to maintain speeds in excess of 70 mph. Traveling at this speed, LaDisa fell behind.

About 4:30 am Drs. Robert and Janet Pettyjohn were awakened by the sound of a crash in their front yard--the ambulance had failed to take a curve (posted 35 mph limit) and had wrapped around the tree in front of the Pettyjohn residence. The Pettyjohns ran out to the macabre scene, just as Bob LaDisa and Mrs. Utnage pulled up. Mrs. Pettyjohn kept Mrs. Utnage from the scene. She was later taken to University General Hospital and treated for shock.

Five people died: The ambulance driver, Charles Kozmar, 28, married and the father of two children; ambulance attendant Robert Lovett, 25, married and father of three children; Candy DeMarco, 20, an EMT trainee, married and mother of one child (investigators were not sure why she was with the ambulance); firefighter Michael Signorelli, 23; and Frank Utnage, 64, the heart attack victim.

The impact of the H&H Ambulance Service vehicle, leaving Indian Rocks Road and sliding into the tree, tore the vehicle apart. The fiberglass top was torn off the 1973 Chevrolet van, the driver's side and floor were buckled and the equipment scattered down the road. Police estimated the speed of the ambulance at the time of impact was 55 mph.

People were scattered all over Pettyjohn's yard. Dr. Pettyjohn, chief of emergency medicine at the hospital since 1973, said the accident was the worst he had ever seen. The doctor said everyone except Mrs. DeMarco appeared to have been killed on impact. The girl had a faint pulse, but by the time she was removed from the vehicle she was dead.

Director of the Division of Environmental Control of the Pinellas County Health Department, George McCall, said ambulances should not exceed posted speed limits. "There is never any reason for an ambulance to drive faster than speed limits allow. There is little to be gained and much to be lost in that kind of performance and this is a perfect example.

"There is no excuse at all for that kind of driving. Whatever the (medical) problem was, it wasn't good enough reason to be driving like that. Instead of one alive at the hospital, there are five dead."

There are no Largo city ordinances or Florida state statutes governing the speed of emergency vehicles. It would be difficult to nationalize emergency vehicle speed limits. What is needed is an emergency vehicle driving course to instruct drivers in safe driving and handling of the vehicles in various situations. This should reduce the number of emergency vehicles involved in accidents.

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*Emergency Product News, 1976, 8 (4, 38.)

Review Exercises

1. Below are several statements relating to the operation of an ambulance. Circle the letter in front of those statements that are correct.

   [✓ a.] Advance route planning can save time in an emergency.

   b. You should use a checklist to inspect the vehicle's medical supplies and life-support equipment once a week.

   [✓ c.] Routine transports are not considered medical emergencies.

   [✓ d.] Ambulances generally require longer stopping distances than ordinary passenger cars.

   e. You should not leave the scene until a patient is stabilized.

2. List two reasons why it is not advisable to drive in the emergency mode with a patient aboard.

   -It can frighten the patient.

   -It can put a stabilized patient into shock.

   -It can disrupt on-going medical treatment.

   -It can aggravate certain medical conditions sufficiently to cause death or permanent disability.

3. Name two conditions that indicate especially smooth, low-speed transport is desirable.

-Spinal injuries.

-Serious fractures.

-Heart attacks.

4. Name two conditions that indicate emergency mode transport is required.

-Uncontrolled hemmorhage.

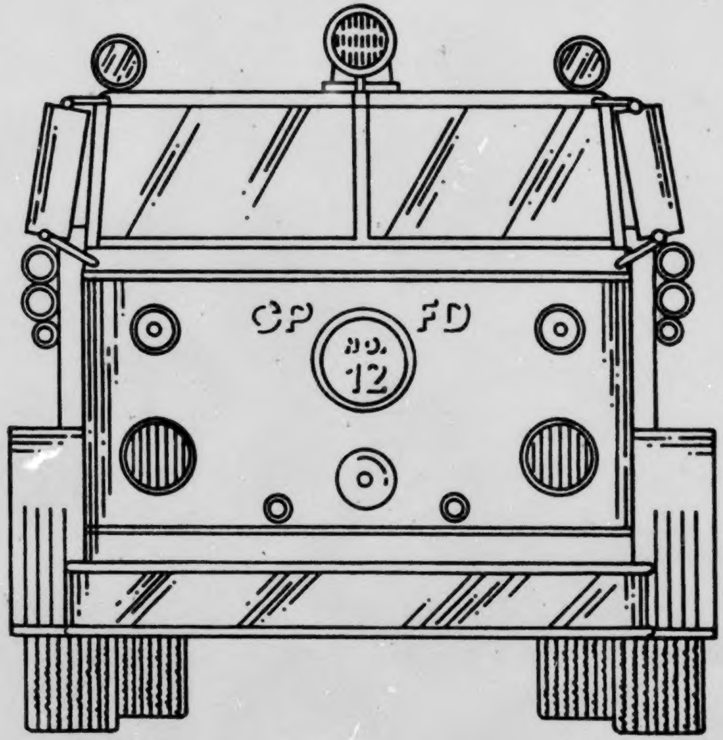
-Uncontrolled cardiovascular or respiratory impairment.

-Complicated impending childbirth.

Training Program for Operation of Emergency Vehicles

PART II: Specialized Unit Operation of Fire Apparatus

INSTRUCTOR LESSON PLANS



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Description of Unit

This unit covers the aspects of emergency vehicle operation that are relevant to members of the fire service.

Module 1

1. INSPECTION AND MAINTENANCE. A detailed listing of the items that should be checked on a daily basis.
2. Periodic Maintenance. A detailed listing of the most important items to be checked periodically.

Module 2

1. SELECTING ROUTES. Presentation of the critical factors to consider when planning or selecting routes.
2. OPERATING SYSTEMS. Power Train. Description of the different types of components in this system; explanation of the way the components work.
3. Braking System. Description of the two most common braking systems in use, and explanation of the way they work.
4. Mission-Related Systems. This section provides a place for the instructor to present information on the mission-related systems most relevant to the trainees.
5. SPECIAL OPERATING CONSIDERATIONS. Vehicle Dynamics. Brief overview of the most critical effects of vehicle dynamics.
6. Size and Weight. Size and weight considerations that operators of fire apparatus should know.

Description of Unit (Continued)

7. Rules About Speed. Explanation of the two basic rules that underlie safe operation of fire apparatus.

Module 3

1. BASIC CONTROL TASKS. Introduction to the basic control tasks, including some basic safety information.
2. Steering. Hints for learning to use steering as a tool.
3. Braking. Procedures for safe, effective braking.
4. Shifting. Explanation of what functions shifting accomplishes, as well as a statement of "do's and don'ts."
5. Backing. Procedures to help minimize backing accidents.
6. Parking. Special considerations (including priorities) for parking large fire apparatus.
7. Negotiating Intersections. Presentation of information especially critical for negotiating intersections safely in fire apparatus.

Trainees' Knowledge Objectives

Module 1

By the end of this module, the trainees:

1. Will be able to demonstrate, on a large fire apparatus, the daily inspection procedure.
2. Will be able to identify on a large fire apparatus, certain inspection items that do not meet manufacturers recommended specifications.

Module 2

By the end of this module, the trainees:

1. Will be able to state two guidelines which should be followed when more than one vehicle is dispatched from the same station.
2. Will be able to name the two basic categories of engines found on large fire apparatus.
3. Will be able to name the two types of transmissions found on large fire apparatus.
4. Will be able to state the primary difference between synchromesh and nonsynchromesh transmissions.
5. Will be able to state the normal operating pressure for air brakes.
6. Will be able to state the normal hydrovac gauge reading.
7. Will be able to state the two basic rules which relate to safe speeds for fire apparatus.

Trainees' Knowledge Objectives (Continued)

Module 3

By the end of this module, the trainees:

1. Given several statements relating to braking techniques, will be able to identify those that are correct.

2. Given a listing of several different types of emergency vehicles, will be able to rank them according to the priorities at a working fire.

3. Will be able to list three techniques that can minimize the possibility of intersection collisions.

Instructor Preparation Activities

Please Note: The unit has been designed to allow the instructor to expand upon and customize the materials. Visual aids such as schematics of the moving parts of the apparatus will facilitate trainees' understanding of this material. Also, it is a good idea for the instructor to obtain as much information as possible about the specific vehicle's the trainees will drive on the job, and any local policies that may be relevant to the operation of fire apparatus in a particular locale.

Module 1

1. Read over the entire module and be prepared to present a lecture on those materials. As you read, remain alert for topics that need expansion based on local policies. Note such topics and obtain the relevant information so that you can present it in class.
2. Preparation for II-F-7. Obtain copies of the inspection checklists that the trainees will use on the job.

Equipment: Chalkboard and chalk.

Materials: Enough copies of inspection checklist for all trainees.

Module 2

1. Read over the entire module and be prepared to present a lecture on those materials.
2. If you can obtain copies of the "owner's manual" for the trainees to examine, it would be very helpful.

Instructor Preparation Activities (Continued)

Equipment: Chalkboard and chalk.

Materials: None

Module 3

1. Read over the entire module and be prepared to present a lecture on those materials.

Equipment: Chalkboard and chalk.

Materials: None

Review Exercises

You will notice that the review exercises do not contain any questions that test the material presented in Module 1. If you wish to "test" the trainees on this material, you can do so by using the inspection checklists you obtained. Use Trainees' Knowledge Objectives numbers 1 and 2 under Module 1 to test this information.

Additional Resource Documents:

Bibliography and reference nos.: 12, 47, 51.

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES

INSPECTION AND MAINTENANCE

Regular inspection of fire apparatus is necessary because the vehicles tend to be complex. Also, fire apparatus carry mission-related equipment which is constantly used and supplies which are continually depleted. In many communities, fire apparatus operators are expected to participate in both daily and periodic maintenance. A recommended daily routine includes the following:

-Tell the trainees about any differences between these procedures and the local routines.

A. Underhood. Check:

  1. Engine oil - within manufacturer's recommendations.
  2. Coolant level - within manufacturer's recommendations.

B. External. Check:

  1. Water tank level, dry chemical, light water, rapid water, wet water levels.
  2. All glass.
  3. Compartments:
     a. Items inside properly secured.
     b. Doors securely latched.
  4. Hose load properly secured and aerial, snorkel, telescopic boom latched in bed.
  5. Tires and wheels:

NOTES

* * * BEGIN MODULE 1 * * *

TSG - II-F-3

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES	NOTES
a. Tires up (thump test).	TSG - II-F-3
b. Tires undamaged.	
c. Wheel lugs show no signs of slippage.	TSG - II-F-4
6. All externally mounted equipment secured.	
7. Primer tank level.	
8. All pump control and aerial control in proper position.	
C. Undercarriage. Check for:	
1. Excess oil, water, and hydraulic fluid leaks.	
2. Apparatus attitude (not leaning excessively, etc.).	
3. No obvious loose or dangling parts.	
D. In cab with motor off. Check that:	
1. Engine shutdown systems operate properly.	
2. Master switches operate properly.	
3. Seat is adjusted to assigned driver.	
4. Mirrors are properly adjusted for assigned driver.	
5. Proper clutch free play.	
E. In cab with motor running. Check that:	
1. Instruments show proper readings (per manufacturer).	

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES	NOTES
2. All lights work.	TSG - II-F-4
3. Wipers work.	
4. Brake warning system works.	
5. Engine turns over at usual speed during start.	TSG - II-F-5
6. All switches in proper position.	
7. Engine develops proper vacuum or air pressure for brakes.	
-If you have a local inspection checklist which covers the major items listed above, distribute it now and discuss the process for making the checks.	
Periodic Maintenance	
Periodic maintenance can often be best carried out by the systems approach. Many of the most important areas to check are as follows:	
-Describe local policy as to who performs which checks. If available, pass out copies of manufacturer's specifications for maintenance, per items below.	
A. Power train inspections must include an undercarriage inspection for leaks and looseness. The power train should occasionally be degreased to assist checking for leaks and cracks.	
1. Engine - check mounts.	
a. Lubrication system.	
1) Change oil filters per manufacturer.	

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES	NOTES
2) Check for oil contamination.	TSG - II-F-5
3) Check for gasket leaks.	
4) Analyze oil if necessary.	
b. Cooling system.	
1) Check level of coolant.	
2) Check coolant for contamination.	
3) Check radiator for external blockage (bugs, etc.).	
4) Check operation of shutters.	TSG - II-F-6
5) Check hoses of water pump.	
6) Check belts to manufacturer's recommended tightness.	
c. Fuel system.	
1) Check for leaks (lines, pump, etc.).	
2) Check filters, drain water and change filters per manufacturer's recommendations.	
3) Accelerator and choke cables free.	
4) Diesel shutdown and emergency shutdown working properly.	
d. Electrical system.	
1) Check battery terminals for cleanliness and tightness.	

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES	NOTES
2) Check hold downs.	TSG - II-F-6
3) Check level and specific gravity of battery water.	
4) Charge as required.	
5) Connections and all wiring clean and tight.	
6) Belts tight per manufacturer's specifications.	
e. Air system.	TSG - II-F-7
1) Air intake unrestricted.	
2) Service air cleaner and filter per manufacturer's specifications.	
f. Exhaust system.	
1) All connections tight.	
2) No obvious leaks or holes.	
2. Clutch and manual transmission.	
a. Proper free play in the pedal per manufacturer's specifications.	
b. Clutch operates smoothly, with no slippage.	
c. Transmission oil clean and at the proper level per manufacturer's specifications.	
d. Transmission case shows no leaks.	
e. Transmission not excessively noisy.	

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES	NOTES
f. Transmission shifts smoothly and stays in gear.	TSG - II-F-7
g. Breather clean, if so equipped.	
3. Automatic transmission.	
a. Stays within manufacturer's specified operating temperature range.	
b. Develops proper pressure and shifts smoothly.	TSG - II-F-8
c. Fluid checked following manufacturer's recommended procedure.	
d. Fluid changed at proper intervals.	
e. Breather clear if so equipped.	
4. Driveshafts.	
a. No excessive slop (gear lash).	
b. U-joints properly lubricated.	
c. Hanger bearings properly lubricated.	
d. No signs of twisting or bending.	
5. Differential.	
a. Proper fluid level (change per manufacturer's specification).	
b. No obvious leaks, especially at seals.	
c. Axle bolts tight and to manufacturer's specifications.	

INSTRUCTIONAL CONTENT/PRESENTATION GUIDELINES	NOTES
d. Differential in proper alignment to chassis.	TSG - II-F-8
6. Chassis and suspension.	
a. Proper lubrication.	
b. No cracks in frame.	
c. No bends or apparent misalignment.	
d. Axles properly secured to suspension.	TSG - II-F-9
e. Springs and suspension properly secured to frame.	
f. No cracked leaves in springs.	
g. U-bolts tight and properly aligned.	
h. Body and cab bolts tight with no signs of chafing.	
i. Front-end alignment checked.	
j. Shocks properly attached.	
7. Tires and wheels.	
a. Tire inflation per manufacturer's recommendations.	
b. Cast spoke lugs checked for tightness and slippage or excessive wobble.	
c. Budd-type wheels checked for lug tightness and cracks.	
d. Tires inspected for cuts, tread depth, and sidewall damage.	

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES	NOTES
8. Steering.	TSG - II-F-9
a. Steering free play per manufacturer's limits.	
b. Inspect linkages and tie rods for acceptable amount of play.	
c. Power steering--proper fluid level.	
9. Brakes (air and hydrovac).	TSG - II-F-10
a. Brakes properly adjusted per manufacturer's specifications. (A rule of thumb for air brakes--take less than 10 p.s.i. for full application.)	
b. All air lines or hydraulic lines tight.	
c. Hydraulic fluid at correct level.	
d. Vacuum connections tight.	
e. Air system bled of water as required.	
f. Air compressor develops proper pressure (governor operating properly).	
g. Slack adjusters properly lubricated.	
h. Maxi or spring brakes properly adjusted.	
i. Correct lining and sufficient lining.	
j. Parking brake controls operating properly.	
k. Air or vacuum gauge working properly.	

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES	**NOTES**
l. Low air warning signal working.	TSG - II-F-10
m. Computer (121) brakes working properly.	
10. Brakes (driveline).	
a. Properly adjusted.	
b. Sufficient lining.	
c. Linkage properly lubricated.	TSG - II-F-11
11. Pump.	
a. Check pump activation system.	
1) Pump disengages easily.	
2) Pump engages smoothly.	
3) Pump noisy when engaged.	
4) Pump throttle working properly.	
b. Check pump transmission oil level and for contamination.	
c. Check priming system for proper operation.	
d. All valves operate smoothly.	
12. Aerial ladder/aerialscope/articulating boom.	
a. P.T.O.	
1) Engages/disengages easily.	

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES	**NOTES**
2) Develops proper pressure.	TSG - II-F-11
b. Automatic throttle operates properly.	
c. All U-joints properly lubricated.	
d. Hydraulic fluid at proper level.	
e. All controls functioning properly.	
f. Locks for bed of aerial/boom working properly.	TSG - II-F-12
g. Stabilizers and outriggers working properly.	
13. Miscellaneous equipment.	
a. Rescue squad winch P.T.O. works properly.	
b. Generators remote start functioning properly.	
c. All power tools working properly.	

* * END OF MODULE 1 * *

SELECTING ROUTES

The operator of fire apparatus needs to be especially careful in selecting routes because of the length and weight of the vehicle.

A. Characteristics of roadways are very significant in the selection of a route for large fire apparatus.

  1. Narrow alleys are more difficult to negotiate. They must be sufficiently wide to permit the fire apparatus to pass through without damaging property along the sides. Negotiating sharp curves of 90° turns may be impossible in narrow alleys.

  2. Support capability of the roadway is critical. Some small bridges and wet dirt roads cannot support fire apparatus.

     - Fire apparatus get stuck easily when dirt roads are wet and muddy.

  3. Be alert for sufficient overhead clearance.

     - Low wires are a real hazard.

B. Access to building entries must be considered in the selection of an approach route. Some fire departments perform periodic access inspections:

  1. In many urban locations, block inspections are regularly conducted. Once a week, an inspection of some block in the station's district is scheduled. By inspecting a different square block each week, the firemen can update their information (and maps) on roads, buildings, and hydrants in the district.

     - Most efficient approach.

     - Location of hydrants.

     - Points of entry (windows, doors).

* * * BEGIN MODULE 2 * * *

TSG - II-F-13

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES	NOTES
•Overhead or other obstructions	TSG - II-F-13
•Optimal parking sites, considering support capability of the ground.	
•Weight limits of parking garages, elevated ramps, etc.	
2. In many suburban and rural locations, a number of buildings are selected for weekly inspections.	
•Buildings selected include institutions such as schools and hospitals, as well as private homes.	
C. Multiple-vehicle responses are common in the fire service, and they affect the selection of routes.	
1. If several vehicles are dispatched from the same station, two guidelines apply:	
a. The first vehicle out should completely clear the driveway before the second vehicle pulls out.	TSG - II-F-14
b. Two or more vehicles traveling in the same direction should maintain a five-hundred-foot distance between vehicles.	
•This distance permits adequate reaction time and stopping distance in the event one vehicle should go out of control. In many states this distance is a legal requirement.	
2. If several emergency vehicles are approaching the scene of an emergency from different directions, they CAN COLLIDE AT AN INTERSECTION.	
•This kind of collision accounts for a high percentage of fire vehicle accidents.	

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES	NOTES
OPERATING SYSTEMS	TSG - II-F-15

OPERATING SYSTEMS

Drivers must be aware of the systems that move and control the fire vehicle and how they operate. Understanding how the systems work and their interactions is necessary for efficient operation, routine maintenance, and troubleshooting.

- Power train.
- Braking system.
- Mission-related suppression or support equipment (i.e., fire pump, aerial/snorkel P.T.O. pump).

Power Train

A. The power train consists of the engine, transmissions, driveshaft, and differential. The engine provides the motive (turning) power and has subsystems which perform other functions.

- Cooling.
- Lubrication.
- Fueling.
- Ignition.
- Carbueration.

B. Many different engines are in use today, but all fit in two basic categories:

-Ask the trainees if they know the catagory of engine in their apparatus.

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES | **NOTES**

1. Gasoline--air/fuel mix ignited by a spark electrically produced.

TSG - II-F-15

2. Diesel--air compressed to provide heat; fuel injected; auto ignition. Diesels are further distinguished by power output:

   a. The regular diesel has limited operating range in comparison with gas engines; power climbs to a peak and then drops.

   b. The high-torque/constant-torque diesel has a wide operating range with power almost constant throughout the range.

C. The transmission modifies the power that the engine produces, to accomplish various tasks such as higher speed, better pulling power, etc.

1. There are two types of transmissions in common use by the fire service.

TSG - II-F-16

- Manual, which is shifted by the operator.

- Automatic, which is usually allowed to shift automatically but can be shifted manually.

2. Manual transmissions can be disconnected from the engine by the clutch. The clutch is comprised of discs which are lined with a high-friction material.

3. Manual transmissions are either synchromesh or nonsynchromesh. Synchromesh transmissions can be shifted without double-clutching and nonsynchromesh transmissions require double-clutching to make engine speed and gear speed match.

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES	NOTES

-Describe double-clutching. Mention that many nonsynchromesh transmissions are still around and are still being purchased.

TSG - II-F-16

a. The most common manual transmissions for fire service use are four- and five-speeds.

b. Automatics most common to fire service are two, four, five, and six speeds.

-Schematic of total driveline should be shown, if possible.

D. The differential transfers power between the driveshaft and the rear axles and then, in turn, to the rear wheels. Some departments utilize a two-speed differential to make better use of available engine power.

Braking System

Two different braking systems prevail in modern apparatus: air and hydrovac. Both systems operate on the principle of multiplying force by applying a small amount of force over a large piston-like area.

A. Air brakes. Air pressure is developed by a compressor driven by the vehicle's motor and stored in air tanks or reservoirs. For parking, air brake-equipped apparatus utilizes one or both of two methods:

1. A driveline brake (actual disc or drum attached to drive shaft activated by lever and cables).

[illegible]G - II-F-17

2. A spring activated brake atop the service brake chamber which automatically applies brakes when air pressure drops below preset pressure.

- Normal operating range is 60-120 p.s.i.

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES	NOTES
B. Hydrovac brakes utilize a vacuum from the engine. Since diesel engines do not produce a vacuum as the gas engine does, hydrovacs are found only on gasoline driven vehicles. Most hydrovac-equipped vehicles utilize driveline brakes or a lock-type device which is applied by moving a lever and stepping on the brake.	TSG - II-F-17

Mission-Related Systems

Mission-related systems include the fire pump (either power take off [P.T.O.] or transmission driven) and the hydraulic system (also P.T.O.) which powers most aerial apparatus.

A. The operator must be familiar with the procedure for engaging any and all such equipment.

B. The operator must be totally familiar with the safe operation of pumps and aerial equipment to efficiently utilize any fire vehicle.

-Present a general over-view of mission-related systems for the fire service vehicle(s) which will be used by the trainees.

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES

NOTES

SPECIAL OPERATING CONSIDERATIONS

TSG - II-F-18

Vehicle Dynamics

Vehicle dynamics are an important consideration for the operators of fire apparatus. A high center of gravity exaggerates side-to-side weight problems.

- Remember you drove a two-ton car to the station. Your pumper may weigh in at 10-15 tons, so don't expect it to handle like the family buggy.

A. Winding roads, sharp curves, soft shoulders, crowned roads and improperly banked roads can cause the fire apparatus to roll over as a result of weight shift.

B. A half-full water tank can cause fire apparatus to skid out of control, as weight shift exceeds the ability of the tires to hold the road during a cornering maneuver. Policy usually requires that the pumper travel either completely full or completely empty. Baffles can make this problem much less serious.

- Virtually all new pumpers have baffles as standard equipment.

–Explain the purpose of "baffles."

–Discuss local policy regarding water load requirements for pumpers.

Size and Weight

A. The length of the apparatus makes it harder to drive.

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES	NOTES
1. A larger gap in cross traffic is required for fire apparatus to cross an intersection.	TSG - II-F-18
2. A large gap in traffic is required when fire apparatus is entering an expressway from a ramp.	
3. A number of lanes in both directions must be used to maneuver fire apparatus through a U-turn.	
-Mention how T/T turns are sometimes necessary.	
4. Sufficient clearance is required forward and to the back of the apparatus when parking at curbside.	
5. Corners must be taken wider to allow for apparatus' length.	
B. The weight of the apparatus can cause unexpected problems.	TSG - II-F-19
1. The weight of the apparatus produces greater momentum than might be expected. Slowing and stopping must be begun well in advance of the stopping point. Forgetting this fact can be especially hazardous at intersections. The only defense against this hazard is:	
a. Scan well ahead of the vehicle.	
b. Travel at speeds which allow control of the vehicle.	
c. Begin to stop well in advance of the intended stopping point.	
2. The power-to-weight ratio of the apparatus generally makes the apparatus hard to accelerate from a stop and hard to accelerate to perform an accident avoidance maneuver.	
-Also point out that vehicles can be overpowered and that causes problems as well.	FIRE

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES

NOTES

3. The weight support capability of the roadway must be accounted for by the fire apparatus operator.

   - Some bridges have a tonnage limit less than the weight of the apparatus.
   - Some parking garages cannot support the weight of the apparatus.
   - The same is true of undermined sidewalks.
   - Apparatus operators can learn the support capabilities of structures in the district during access inspections.

TSG - II-F-19

Rules About Speed

Because of the unique characteristics of fire apparatus, two rules dictate the speed at which it is safe for fire apparatus to travel.

A. FIRE APPARATUS SHOULD NOT EXCEED POSTED SPEED LIMITS. While this may seem extreme, it should be remembered that a heavy fire apparatus can easily go out of control. Its lights and siren will help clear a path through traffic.

B. FIRE APPARATUS SHOULD NOT EXCEED CAUTIONARY SPEEDS. Cautionary limits are displayed as warnings on expressway ramps and at sharp curves. It is often difficult to control a passenger car at any speed above that posted. Since fire apparatus are far more difficult to control, they should never be driven above cautionary speeds. Speed should be reduced to cautionary limits by braking and gearing down.

TSG - II-F-20

* * END OF MODULE 2 * *

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES	**NOTES**
BASIC CONTROL TASKS	* * * BEGIN MODULE 3 * * *
A. Since the operator spends more time behind the wheel of his car than behind the wheel of an engine or truck, he must constantly remind himself of the performance differences.	TSG - II-F-21
B. The operator must also develop an awareness of the safety of the crew on board. •They are often not readily visible to him.	
-List major safety points on the chalkboard.	CHALKBOARD
1. Standard start out procedures should be established if none exist, i.e., standard signals from the tailboard crew which indicate stop, go, and okay to back up. 2. Crew should ride in the cab or in enclosed areas wherever possible. 3. Turnout gear should be on and seat belts used. 4. Pay attention to station door activation system. Is the door fully open? Will timer cause it to close on you on the way out?	
C. Safe, smooth responses demand coordination of steering, braking, shifting, and the perception of hazards, tempered with good working knowledge of the vehicle's dynamics.	
Steering	
A. The operator should be thoroughly familiar with the steering "feel" of each vehicle he is assigned to drive. No two vehicles have the same "feel," the operator should get to know it to prevent problems before they occur.	FIRE

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES	NOTES
B. To eliminate unnecessary strain, avoid turning power-assisted steering when the vehicle is stationary.	TSG - II-F-21
C. If the vehicle has air-assisted steering, constant maneuvering may reduce air pressure to a point where spring brakes may apply.	TSG - II-F-22
D. Be familiar with the "track" the vehicle makes and the amount of room required for turns, etc. ***–Explain the vehicle "track."***	CHALKBOARD
E. If the vehicle has an extreme overhang, as some do, the operator must learn the clearances.	
F. The operator should use the 10 o'clock and 2 o'clock positions on the steering wheel for straight-ahead driving.	
G. The operator should not wrap his thumbs around the steering wheel, as the spokes may catch and break a thumb as the wheel spins.	
H. The operator should not allow his hands to cross on the wheel. He should not "palm" power steering. ***–Explain the term "palming."***	
I. For off-road operations, the operator should keep a light touch on the wheel. If he hits an obstacle, the wheel can whip.	
J. To climb curbs, steps, etc., the operator should stop before the curb (one to two feet away) and let the vehicle inch toward the curb without power. He should keep a light touch on the wheel and apply power only after the wheels have gently touched the curb. He should not "scrub" radial tires against the curb.	

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES | **NOTES**

K. Knowledge of vehicle dynamics should be used to "set up" the vehicle for turns. The operator must, however, be extremely familiar with the vehicle's "feel" to apply these principles.

TSG - II-F-22

Braking

TSG - II-F-23

A. Normal air operating pressure is 60-120 p.s.i. Normal hydrovac gauge reading is 20-25 inches mercury.

-See manufacturer's specifications. The operator should know these specifications for his vehicle.

B. Feel is important here also; be aware of the differences.

1. Hydrovacs often require extra "pump" to stiffen them.
2. Hard constant pressure on air brakes often causes "nosedive" prior to a stop. The operator should ease off prior to the stop to smooth out the stop.

C. In normal use, the operator should not pump or fan the air brakes.

- This action uses too much air.

D. Constant pressure on brakes causes tremendous heat build-up and brake fade. On steep grades use brakes intermittently to allow cooling and utilize engine compression to help slow the vehicle.

E. Locking up the brakes actually reduces stopping efficiency and shortens tire life.

F. The operator should learn the procedures to follow for the vehicles he drives in the event of air or vacuum loss.

-Explain the proper procedure for the type of system(s) to be used by the trainees.

TSG - II-F-23

G. Use parking brakes as recommended by the manufacturer. Use secondary means if available (driveline brake, chocks, etc.).

H. The operator should remember that with computerized brakes, if the computer fails, the system returns to normal air operation and he must gain control.

I. Many trucks are equipped with "dry road/slippery road" or "front wheel limiting valves" for the driver's use.

-Explain what these items do.

Shifting

TSG - II-F-24

A. Shifting entails proper gear selection to accomplish the driver's objective for the power the engine produces; i.e., speed up, slow down, pull ahead. The transmission is the driver's tool; he must be able to utilize it properly.

B. Manual shifting do's. A good driver:

1. Knows shift patterns of every piece of apparatus he drives.
2. Knows just where the clutch begins to catch.
3. Shifts before or after turns so as to keep both hands on the wheel during turns.
4. Takes his foot off the clutch immediately after completing shifts.

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES	NOTES
-*Mention engine brakes and how they affect shifting if left on.*	TSG - II-F-24
5. Places transmission in neutral and lets clutch out if vehicle will be parked idling for an extended period.	
-*Explain about throw-out bearing wear.*	
6. Knows that heat and shock loading are major cuases of premature driveline failure.	
-*Discuss shock loading.*	
7. Is capable of determining when clutch needs adjustment.	
●When free travel becomes excessive or clutch catched too far out.	
8. Can double-clutch properly on upshifts and downshifts.	
9. Knows the speed ranges of each gear.	
10. Knows how to "flare out" shifts to get load off transmission to make shifting easier.	
11. Chooses proper gear to get vehicle moving on different terrain.	
●Don't overspeed engine.	
12. Is aware of special equipment on his vehicle, i.e., clutch brake, retarder.	TSG - II-F-25
C. Manual shifting don'ts. A good driver doesn't:	
1. Force transmission into gear.	
2. Hold vehicle on hill with the clutch.	

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES	NOTES
3. "Pop" clutch, especially on diesel.	TSG - II-F-25
4. "Ride" the clutch.	
•Even the slightest pressure on the pedal causes wear.	
D. Manual shifting hints.	
1. It is not necessary to upshift just because the engine is at governed speed. If the operator is in a congested area, he may achieve better performance by not shifting; he'll have good engine braking as well as power to accelerate. Remember, the transmission is a tool.	
-*Discuss other instances where not shifting is an advantage.*	
2. If the transmission is hard to get out of gear on upshifts try "flaring out" shifts. Run the engine up to desired speed and hold it there a few seconds before attempting to shift. This lessens the shock on the driveline components.	
3. Many drivers experience difficulty with synchromesh transmissions because they don't move the shift lever from gear to gear fast enough.	
4. Some departments that use both synchromesh and nonsynchromesh transmissions require drivers to double clutch all vehicles. This keeps drivers in practice and eliminates the need for knowing which vehicles have which transmissions.	
-*Discuss local policies.*	
5. Know what the manufacturers recommend for engine operating range, and use the transmission to keep the engine within it.	TSG - II-F-26

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES

NOTES

E. Automatic shifting do's. A good driver:

1. Learns what manufacturer's recommendations are for automatic upshifting and downshifting.

2. Learns what extra features transmission may have and how to use them properly.

   - Such as "detent," retarders, etc.

3. Attempts to learn how to manipulate the transmission with the accelerator to make it work smoothly. Learns speed ranges in each gear.

TSG - II-F-26

F. Automatic shifting don'ts. A good driver doesn't:

1. Overheat transmission.

   - Operator must watch temperature gauge for transmission oil.

2. Try to force downshifts at speeds above those recommended by the manufacturer.

Backing

Because of the size of fire apparatus, the operator's visibility is limited when attempting to back the vehicle. As a result, BACKING SHOULD BE AVOIDED whenever possible. If backing must be performed, several techniques will improve safety of the operation:

-Discuss standard warning signals.

A. Signal with horn and lights to warn other emergency personnel, motorists, and pedestrians.

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES	NOTES
B. Monitor rear- and side-view mirrors.	TSG - II-F-26
C. Assign crew members to assist in backing.	TSG - II-F-27

- Direct traffic.
- Stand off rear fenders and direct backing operation.
- Stand off right front of vehicle and walk vehicle back.

Parking

The procedures and techniques for parking large fire apparatus were covered in the first part of the course and in the Backing section of this unit. In this part of the unit, special considerations for parking fire apparatus will be addressed.

A. At the scene of a working fire, the parking positions of fire equipment must facilitate, and not interfere with, performance of the mission.

1. Suppression apparatus have the first priority in choosing a parking position.

    a. Aerial apparatus must be parked at the appropriate distance from access points to the building; clear access free of overhead obstructions is critical; space must be available for putting down the outriggers or jacks; outriggers need to be on pavement or firm ground.

        - At garden-type apartment complexes, access is often difficult. Use lighter units to advance lines off road. Keep one set of tires on sidewalk if available.

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES	NOTES
b. Pumpers must not obstruct aerial ladder movements or block access to ground ladders.	TSG - II-F-27
c. Pumper apparatus must be parked at the proper distance from hydrant, standpipe, sprinkler connection or water source; space must be available for laying hose or setting up an auxiliary canvas tank in rural operations.	
•Proper speed during hose laying operations will reduce "S-turning" and help keep most of the street clear.	
•Remember, it is virtually impossible to drive over large diameter (four to six inches) hose without damaging it.	
•Do not drive over couplings. Straddle the apparatus over the hose if you must drive where it's been laid.	
•It's very embarrassing to park on someone's supply line.	
2. Support vehicles have second priority in choosing a parking position.	
a. Ambulances must be upwind of a fire and must be reasonably near the victim.	
b. Police cars are parked to allow other emergency vehicles easy access to the scene; they may also be parked to facilitate crowd control.	TSG - II-F-28
B. The vehicle must be protected at the scene of a fire:	
1. Ground support capability, for both the apparatus and its outriggers, must be evaluated.	

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES | **NOTES**

2. Chocks should be placed squarely, not at an angle, in front of the rear wheels. Chocks should be placed behind rear wheels if vehicle is facing uphill.

TSG - II-F-28

3. The operator stays with the vehicle, monitoring instruments and gauges; he must be prepared to move the vehicle efficiently if so ordered by an officer.

–Explain that "chocking" is also called "scotching."

Negotiating Intersections

Preventing intersection collisions is a special concern for fire apparatus because they require extremely long stopping distances.

A. The best procedures for preventing intersection collisions are the following:

1. Travel with windows down, to hear other sirens.
2. Slow down to 10 mph on approaching an intersection.
3. Vary the sound of the siren to attract attention.
4. Turn the siren off for brief intervals to permit detection of other emergency vehicles.
   - Air horns help too (intermittent blasts, listening for others).
5. Look left - straight - right - left before proceeding through an intersection.

B. Some additional knowledge could help avoid a collision.

TSG - II-F-29

1. What other units have been dispatched?

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES

- Are other units on other calls? Could fill-ins or transfers unfamiliar with your normal routes be running with you?

2. From which direction will the other units approach the scene?

- Know standard procedures for laying into the fireground using Straight, Reverse and Split Procedures.

3. Knowing their direction of approach, the operator should anticipate potential points of conflict (intersections) and be especially cautious when approaching them.

NOTES

TSG - II-F-29

* * END OF MODULE 3 * *

Review Exercises

1. List two guidelines which should be followed whenever more than one vehicle is dispatched for a given fire station.

-The first vehicle should completely clear the driveway before the second vehicle pulls out.

-Two or more vehicles traveling in the same direction should maintain a five-hundred (500) foot distance between each other.

2. What are the two basic types of engines in use on fire apparatus?

-Gasoline

-Diesel

3. What are the two types of transmissions in general use on large fire apparatus?

-Manual

-Automatic

4. What is the primary difference between synchromesh and nonsynchromesh transmissions?

-Synchromesh transmissions can be shifted without double-clutching.

5. What is the normal operating pressure for air brakes?

-60-120 p.s.i.

6. What is the normal hydrovac gauge reading?

-20-25 inches mercury.

7. List the two basic rules which relate to safe speeds for fire apparatus.

-Fire apparatus should not exceed posted speed limits.

-Fire apparatus should not exceed cautionary speeds.

8. Below are several statements relating to braking techniques. Circle the letter in front of those that are correct.

[✓ a.] In normal use, you should not pump or fan air brakes.

b. Locking the brakes will reduce stopping efficiency.

c. If computerized brakes fail, the apparatus will have no braking capability.

9. Below is a listing of several different types of emergency vehicles. Rank them according to parking priorities at a working fire by placing a "1" beside the vehicle with the first priority, a "2" beside the vehicle with second priority, etc.

1 Pumper

3 Police vehicle

2 Ambulance

10. List three techniques that can minimize the possibility of an intersection collision.

-Travel with windows down.

-Slow to 10 mph when approaching an intersection.

-Vary the siren sound.

-Turn siren off for brief intervals.

-Look left-straight-right before proceeding through an intersection.

APPENDIX 1

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APPENDIX 2

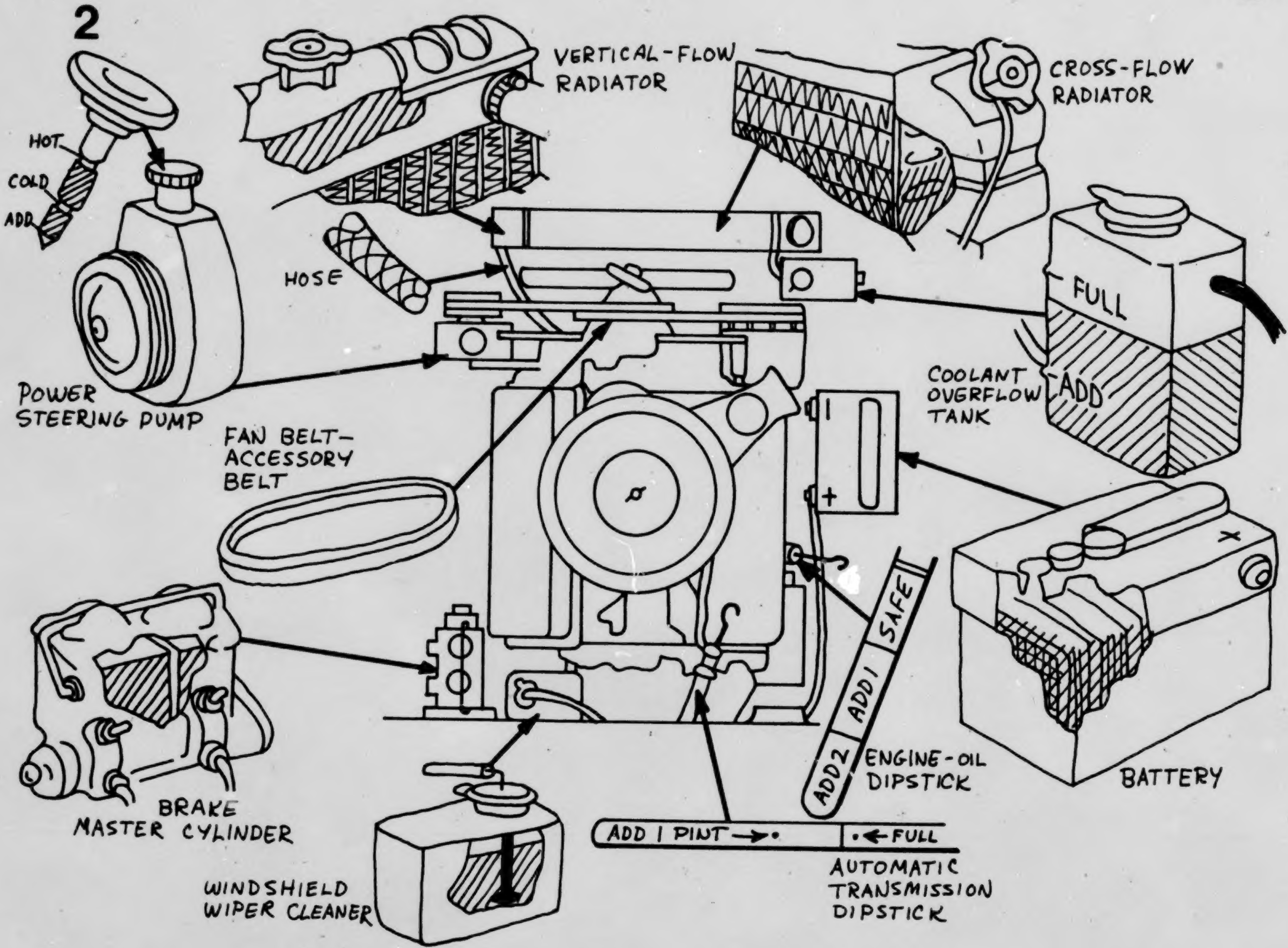
Masters for Transparencies

699

Note

The Instructor Preparation Activities in Unit I-C provide directions for preparing a local map transparency. This space has been set aside for that map.

INSTRUCTOR PREPARED MAP

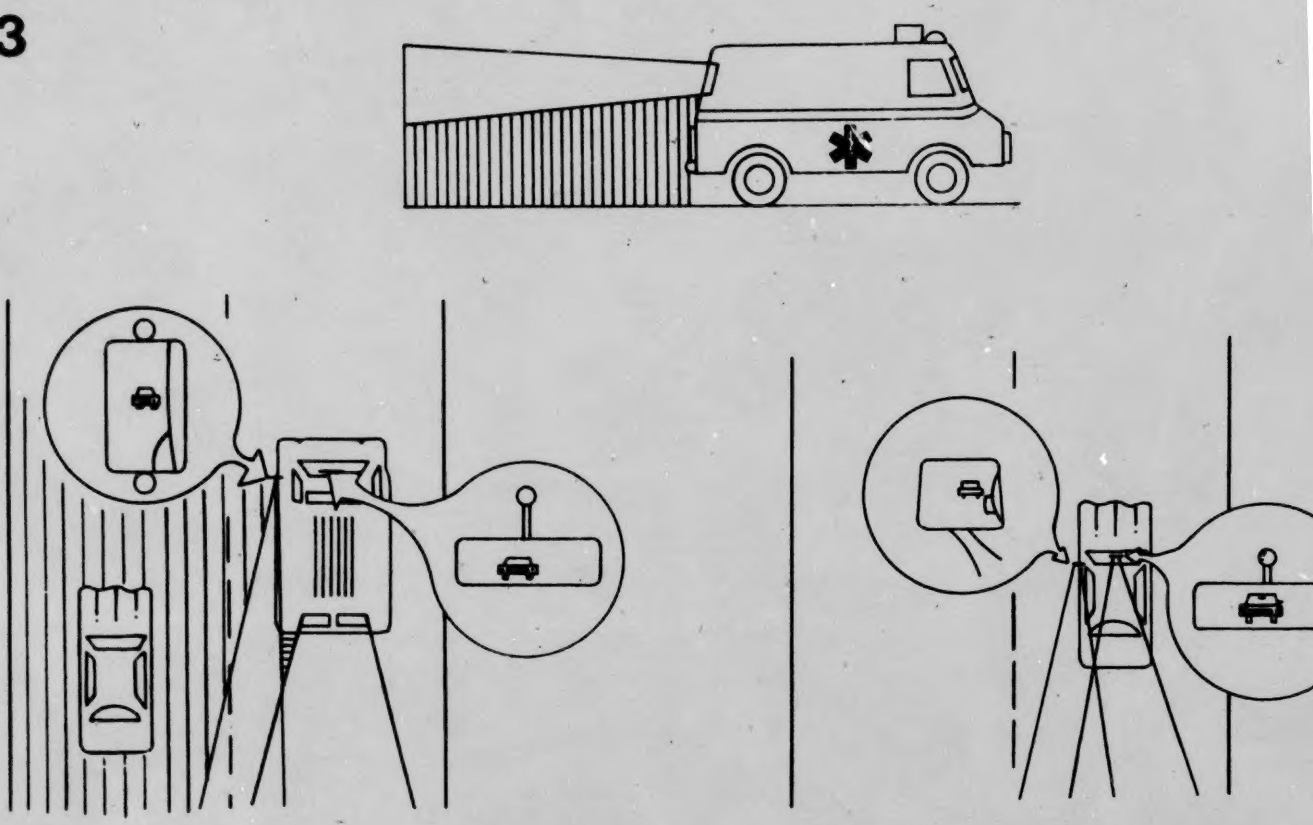

2
VERTICAL-FLOW RADIATOR
CROSS-FLOW RADIATOR
HOT
COLD
ADD
HOSE
FULL
ADD
COAST OVERFLOW TANK
POWER STEERING PUMP
FAN BELT-ACCESSORY BELT
COOLANT OVERFLOW TANK
+
SAFE
ADD 1
ADD 2
ENGINE-OIL DIPSTICK
BATTERY
BRAKE MASTER CYLINDER
ADD 1 PINT
FULL
AUTOMATIC TRANSMISSION DIPSTICK
WINDSHIELD WIPER CLEANER

ENGINE COMPONENTS

701

702

3

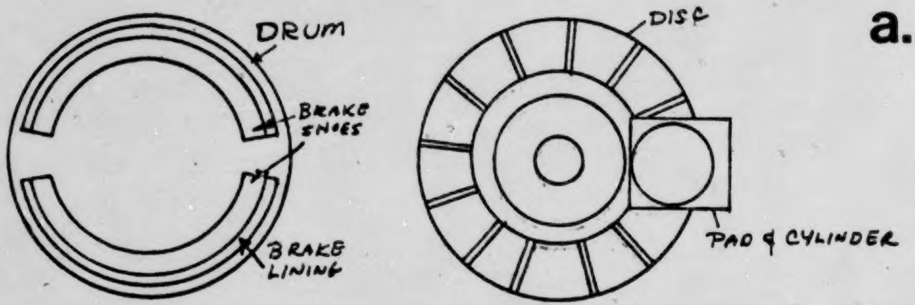


▥ Blind Spot

MIRROR ADJUSTMENTS--BLIND SPOTS

4

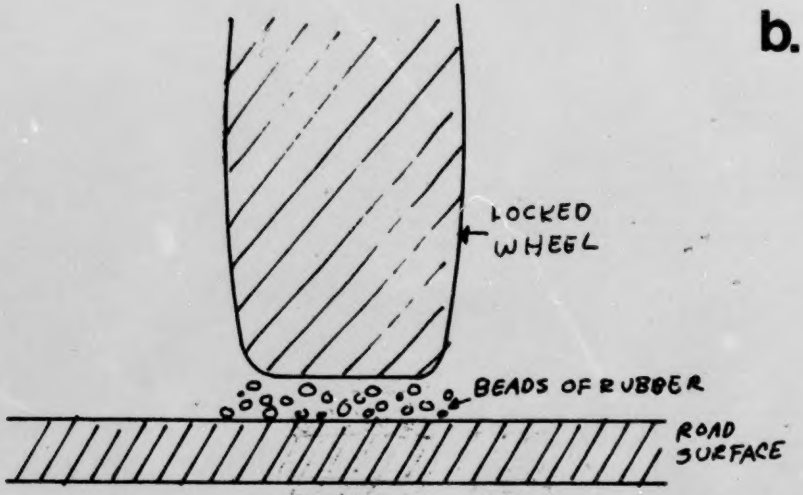
a.


DRUM
BRAKE SHOES
BRAKE LINING
DISC
PAD & CYLINDER

DRUM BRAKE

DISC BRAKE

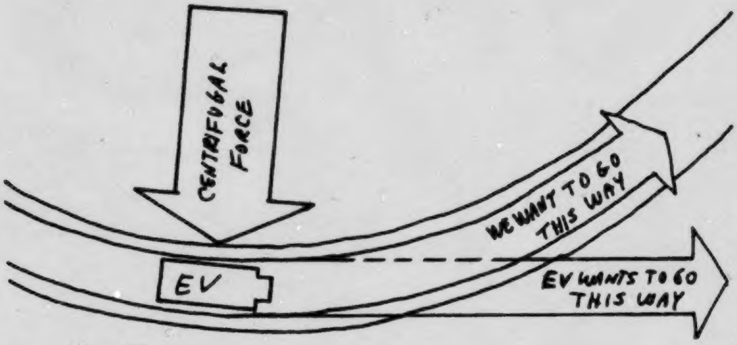
b.


LOCKED WHEEL
BEADS OF RUBBER
ROAD SURFACE

LOCKED WHEEL--SLIDING TIRE

5

a.

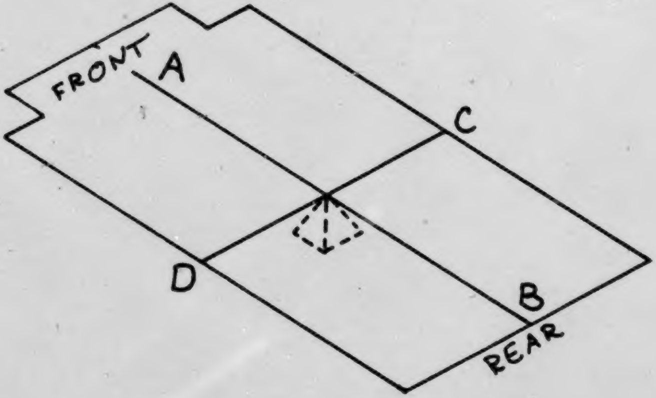


CENTRIFUGAL FORCE
WE WANT TO GO THIS WAY
EV
EV WANTS TO GO THIS WAY

EFFECT OF CENTRIFUGAL FORCE

---

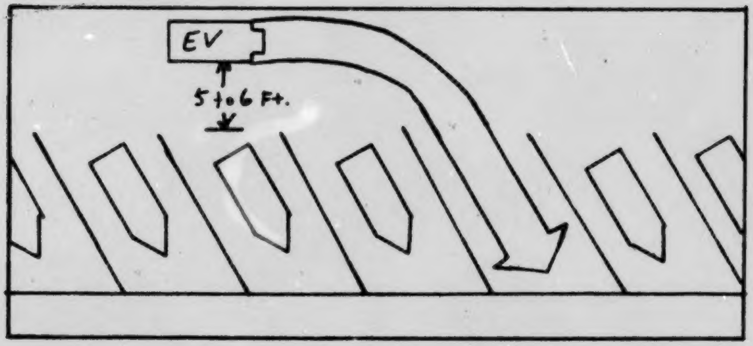
b.



FRONT
A
C
D
B
REAR

WEIGHT TRANSFER

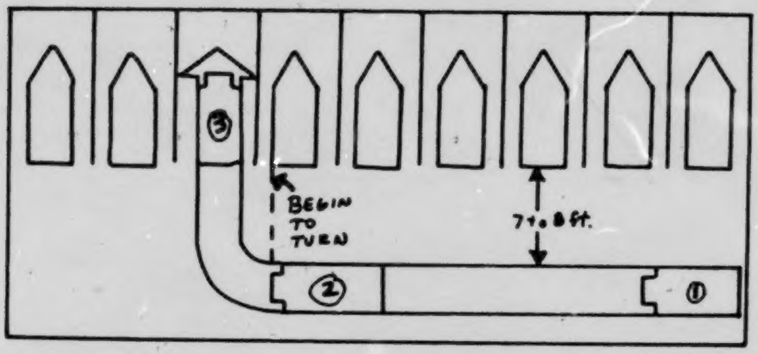
6

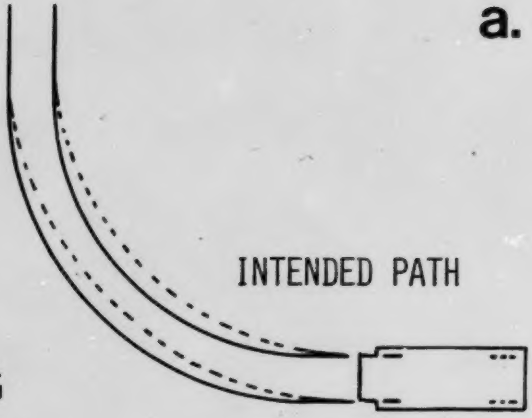


ANGLE PARKING 706

7

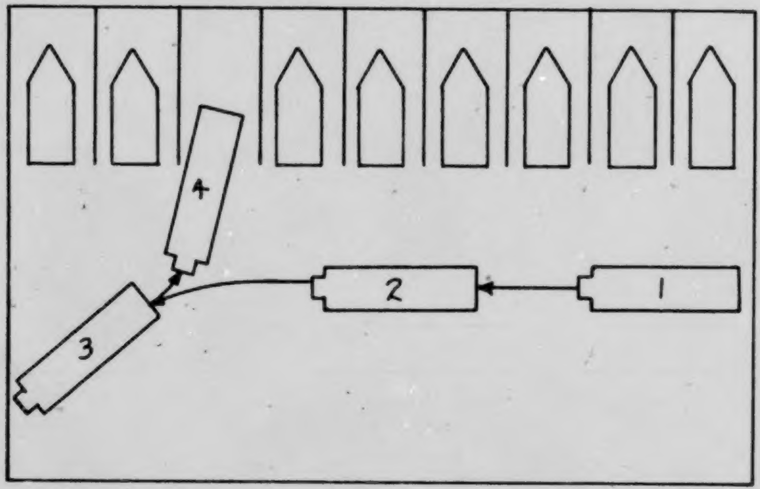
a.


③
BEGIN TO TURN
7 to 8 ft.
②
①


INTENDED PATH

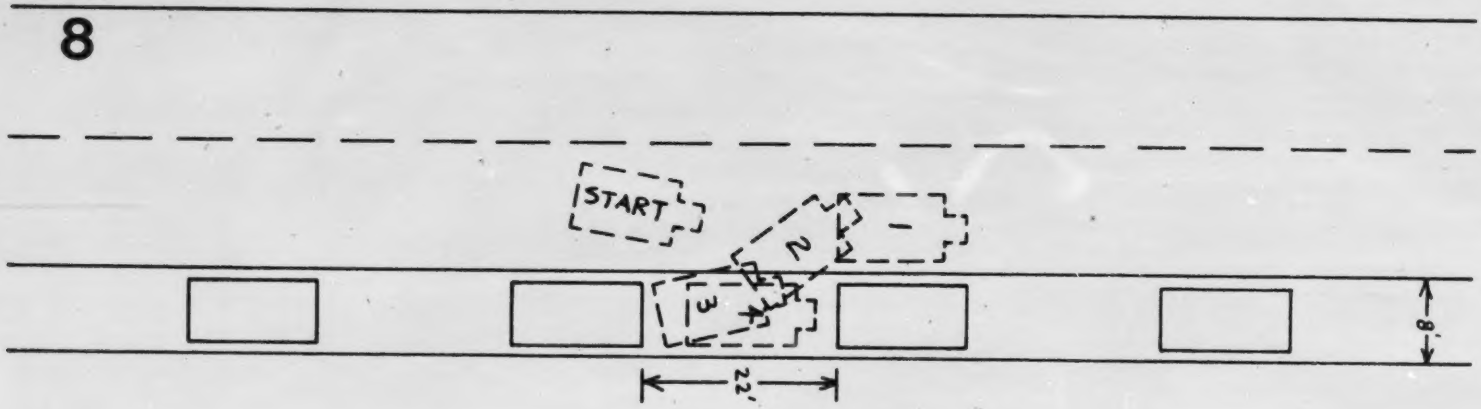
PERPENDICULAR PARKING
(SEDANS AND VANS)

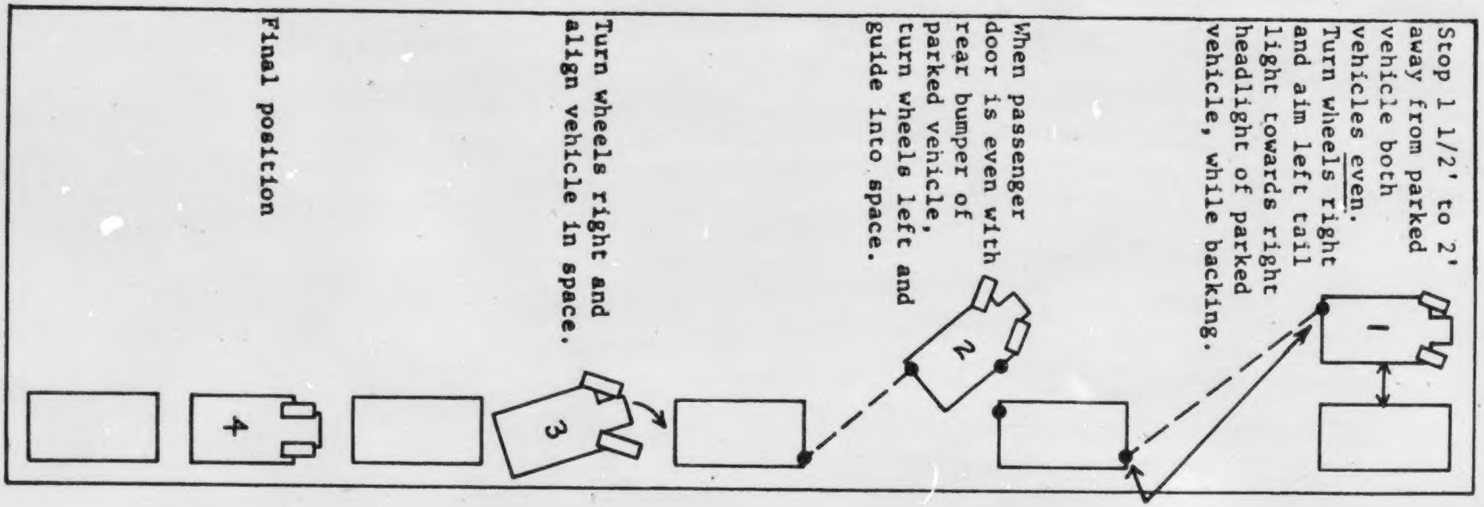
b.



PERPENDICULAR PARKING
(LONG WHEEL-BASE VEHICLES)

8




Stop 1 1/2' to 2' away from parked vehicle both vehicles even. Turn wheels right and aim left tail light towards right headlight of parked vehicle, while backing.

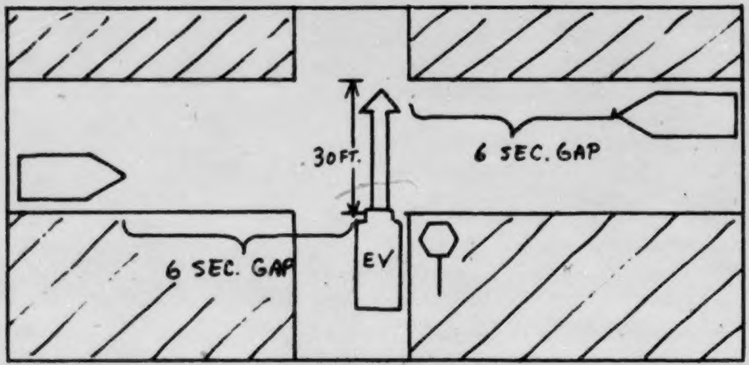
When passenger door is even with rear bumper of parked vehicle, turn wheels left and guide into space.

Turn wheels right and align vehicle in space.

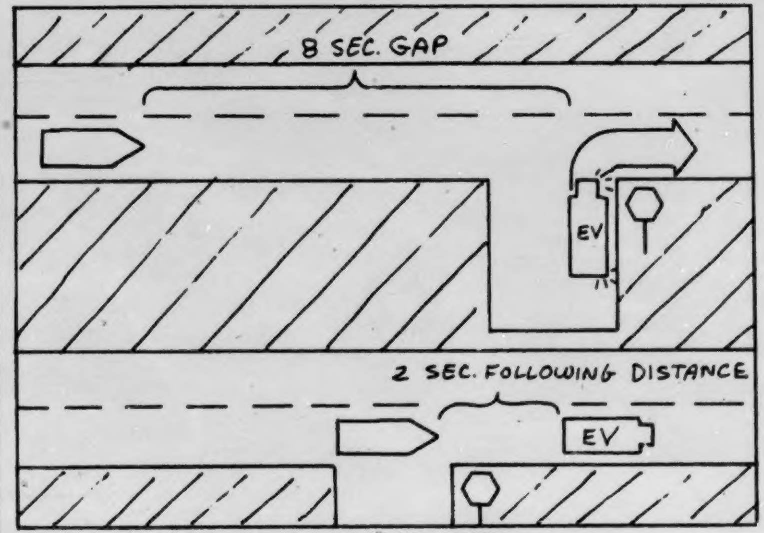
Final position

PARALLEL PARKING

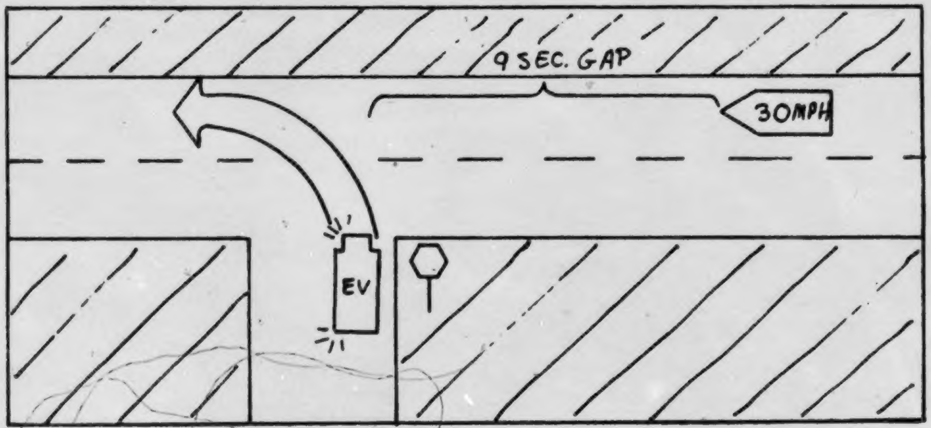
9


30 FT.
6 SEC. GAP
6 SEC. GAP
EV

6-SECOND GAP
CROSSING AN INTERSECTION **a.**


8 SEC. GAP
EV
2 SEC. FOLLOWING DISTANCE
EV

8-SECOND GAP
RIGHT TURN AT AN INTERSECTION **b.**

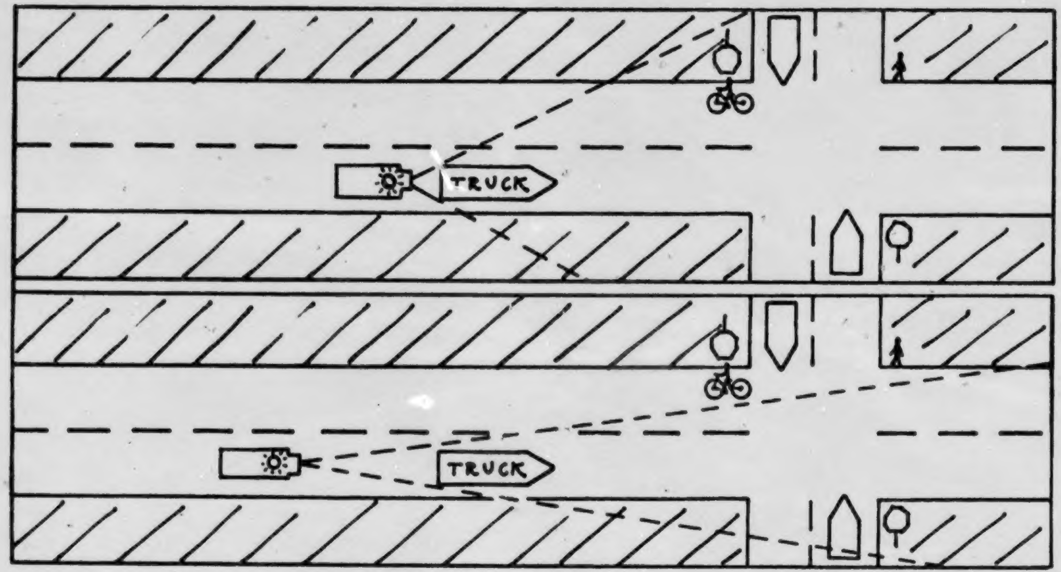

9 SEC. GAP
30MPH
EV

9-SECOND GAP
LEFT TURN AT AN INTERSECTION **c.**

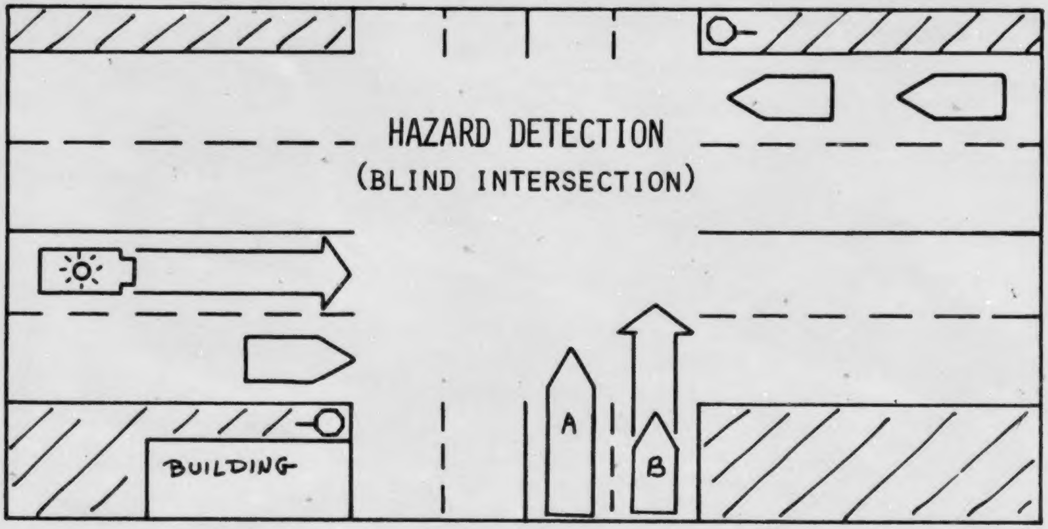
710

711

10

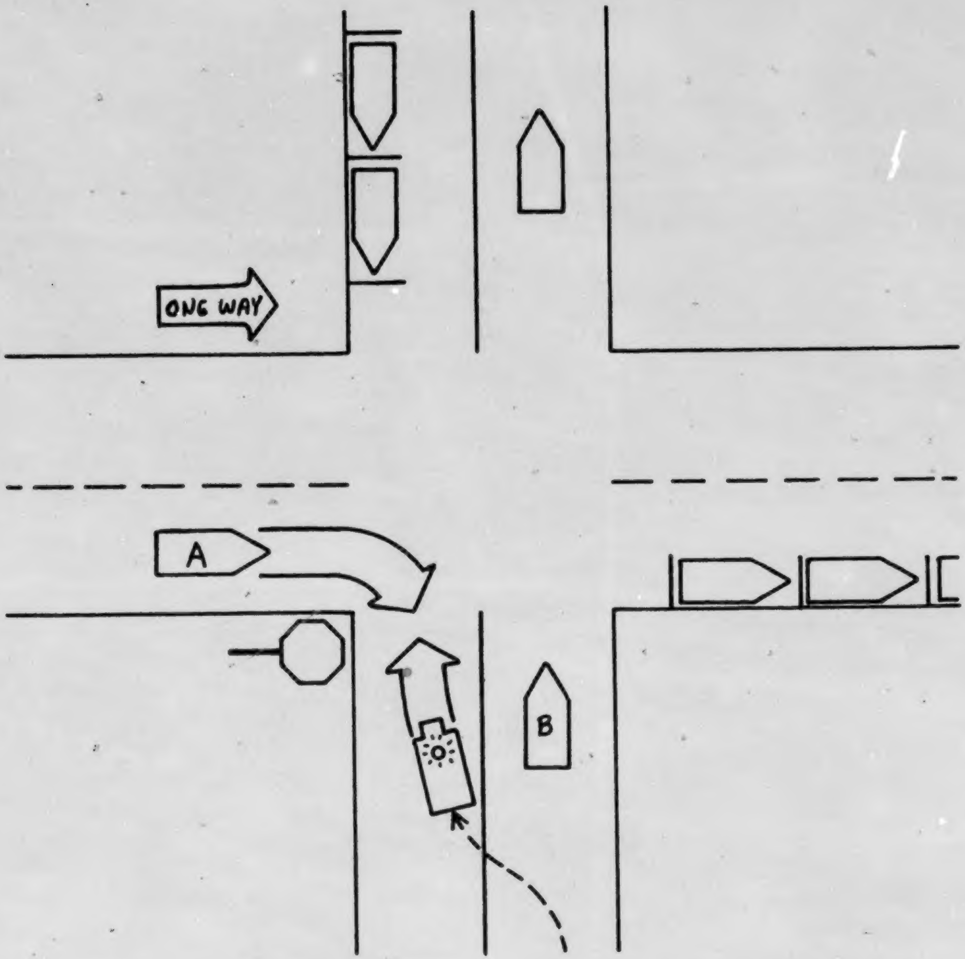

a.
TRUCK
TRUCK

HAZARD DETECTION
(FOLLOWING DISTANCE)


b.
A
B
BUILDING

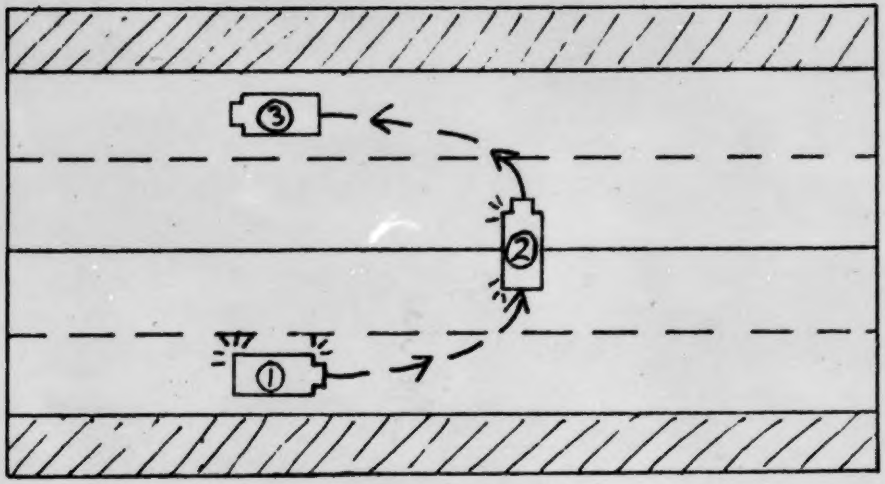
HAZARD DETECTION
(BLIND INTERSECTION)

11

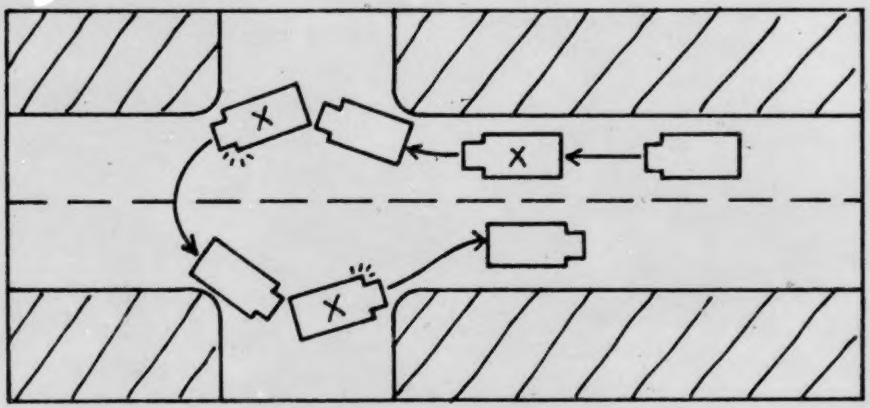


PASSING AT AN INTERSECTION

12

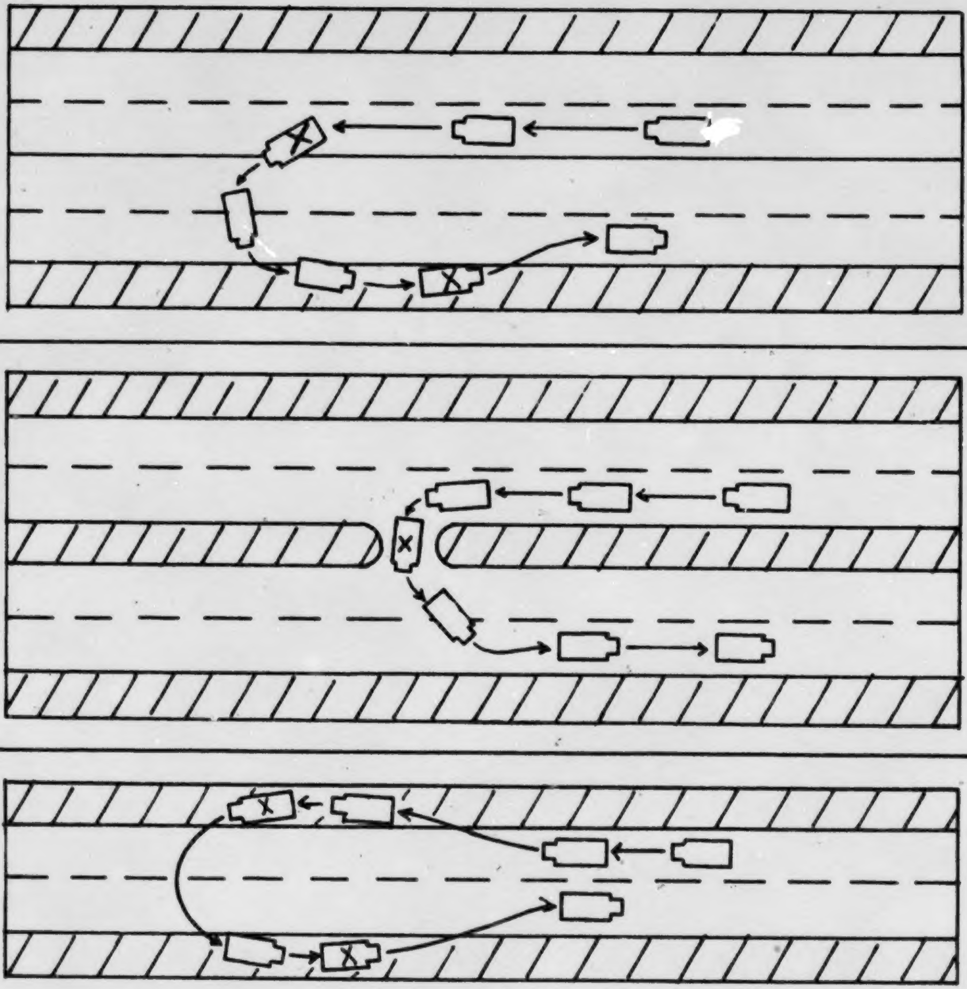


U-TURN ON A FOUR-LANE ROAD **a.**



U-TURN AT AN INTERSECTION **b.**

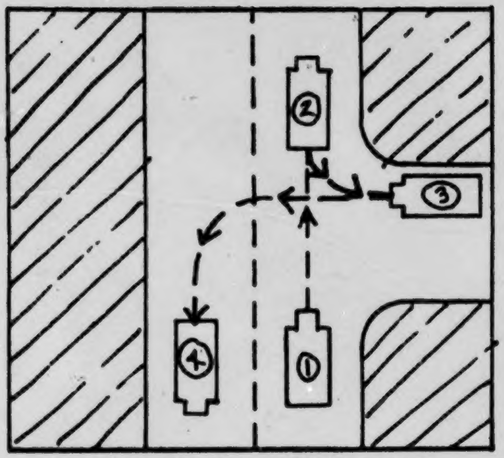
13



SEVERAL U-TURN ILLUSTRATIONS

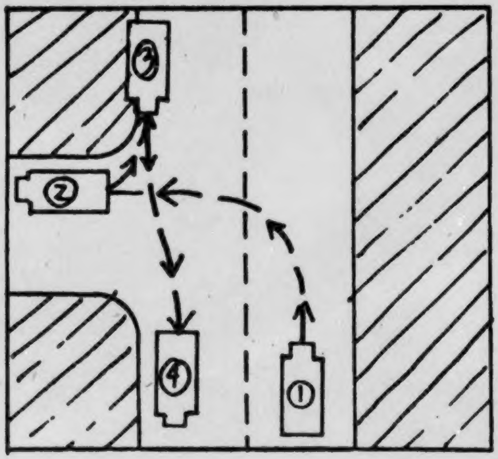
14

a.



TWO-POINT TURNABOUT
(RIGHT SIDE-ROAD)

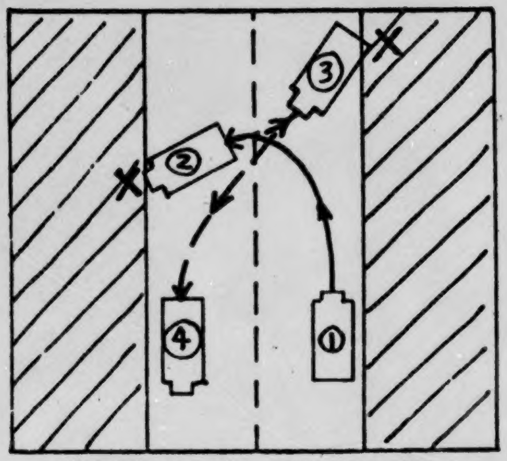
b.



TWO-POINT TURNABOUT
(LEFT SIDE-ROAD)

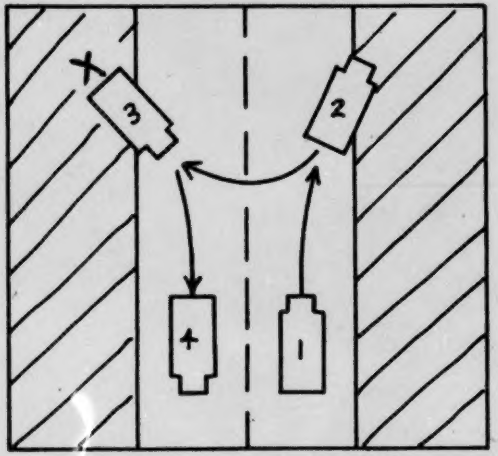
15

a.



THREE-POINT TURNABOUT
(Y-TURN)

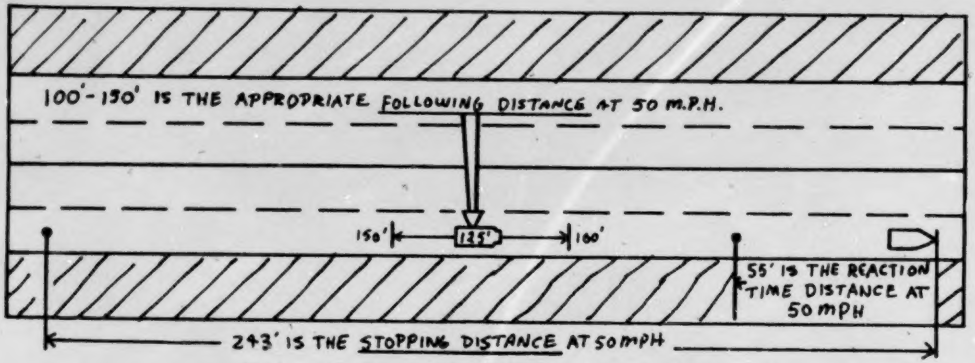
b.



THREE-POINT TURNABOUT
(BOOTLEG)

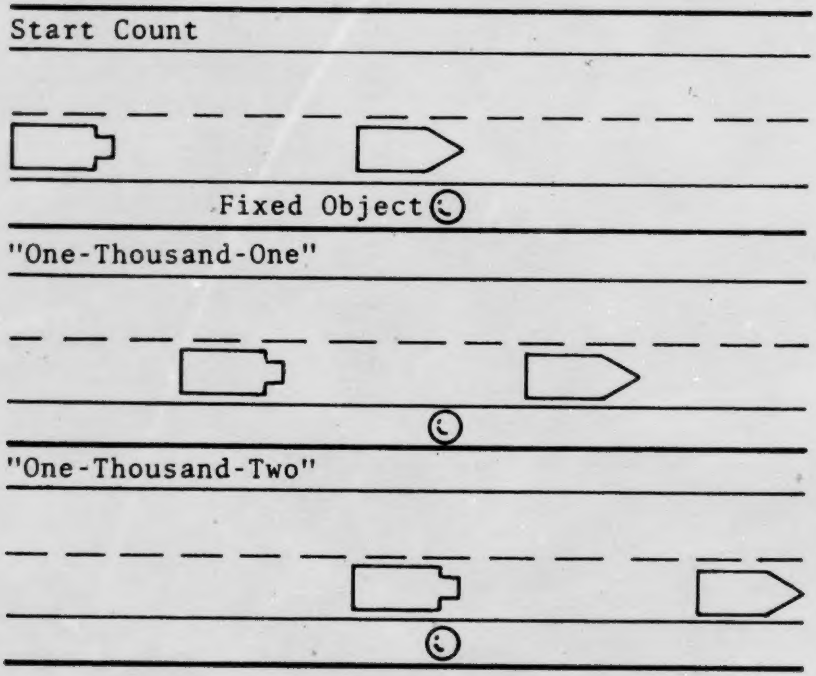
16

a.


100'-150' IS THE APPROPRIATE FOLLOWING DISTANCE AT 50 M.P.H.
150'
125'
100'
55' IS THE REACTION TIME DISTANCE AT 50 mPH
243' IS THE STOPPING DISTANCE AT 50 mPH

FOLLOWING DISTANCE AT 50 MPH

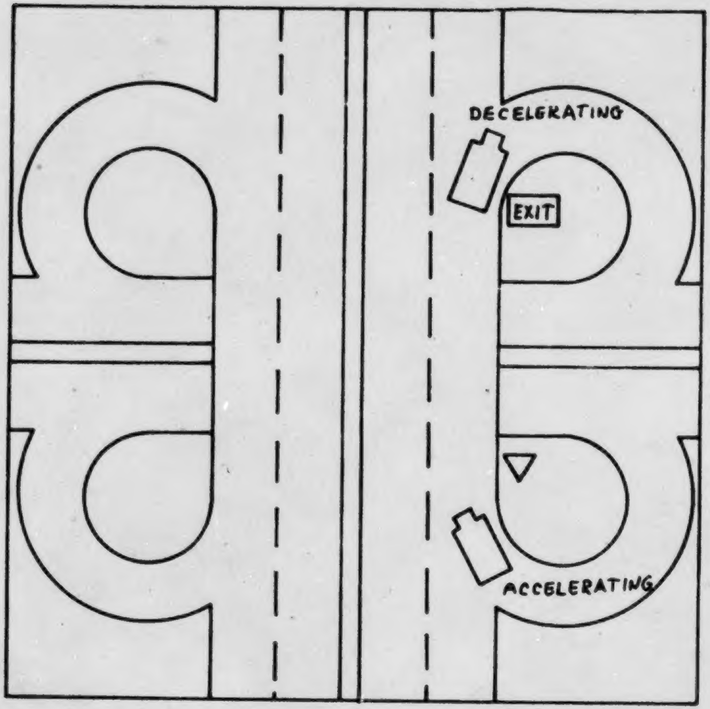
b.


Start Count
Fixed Object
"One-Thousand-One"
"One-Thousand-Two"

TWO-SECOND RULE

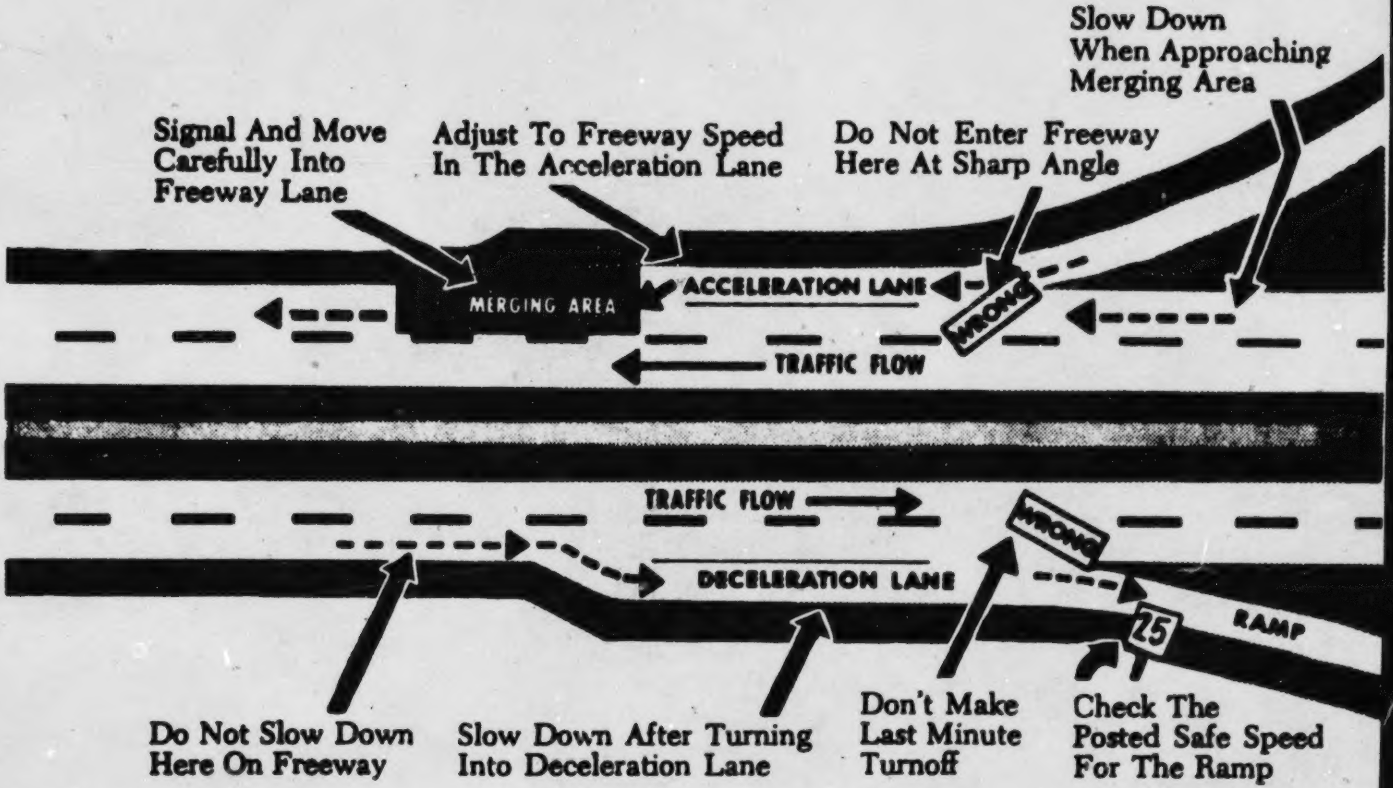
718

17


DECELERATING
EXIT
ACCELERATING

CLOVERLEAF 719

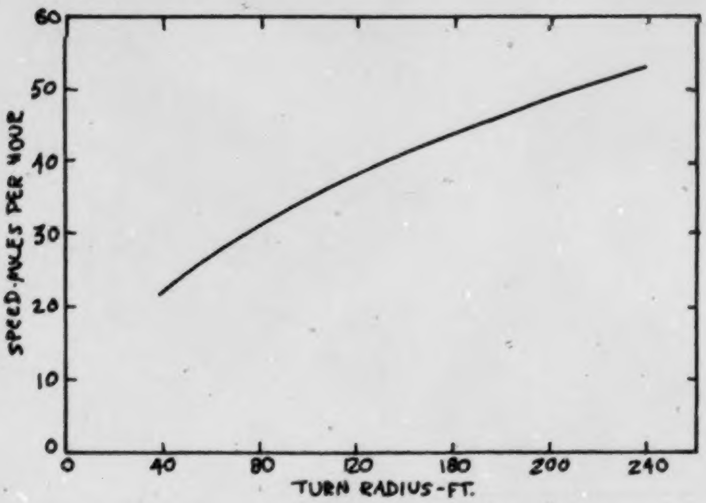
18


Slow Down When Approaching Merging Area
Signal And Move Carefully Into Freeway Lane
Adjust To Freeway Speed In The Acceleration Lane
Do Not Enter Freeway Here At Sharp Angle
ACCELERATION LANE
MERGING AREA
WRONG
TRAFFIC FLOW
TRAFFIC FLOW
WRONG
DECELERATION LANE
25
RAMP
Do Not Slow Down Here On Freeway
Slow Down After Turning Into Deceleration Lane
Don't Make Last Minute Turnoff
Check The Posted Safe Speed For The Ramp

ENTERING AND EXITING FREEWAYS

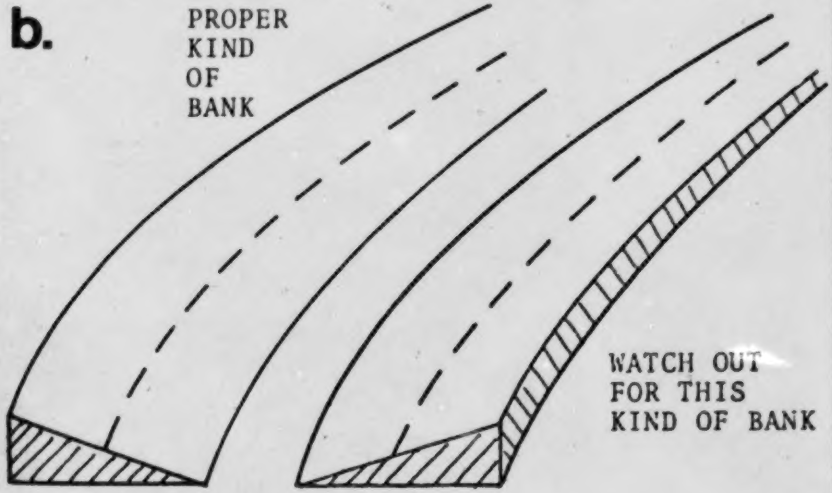
19

a.



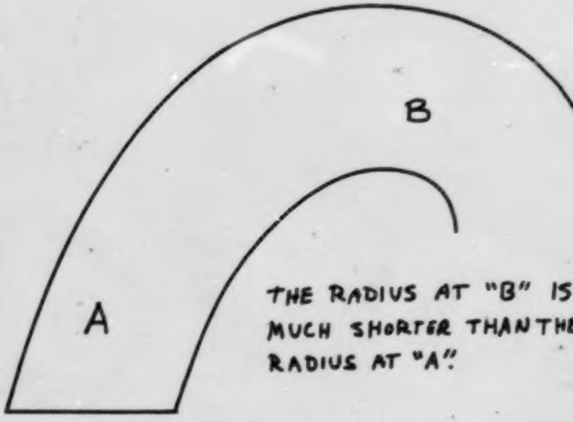
MAXIMUM SPEED FOR TRAVELING CURVES

b.


PROPER
KIND
OF
BANK
WATCH OUT
FOR THIS
KIND OF BANK

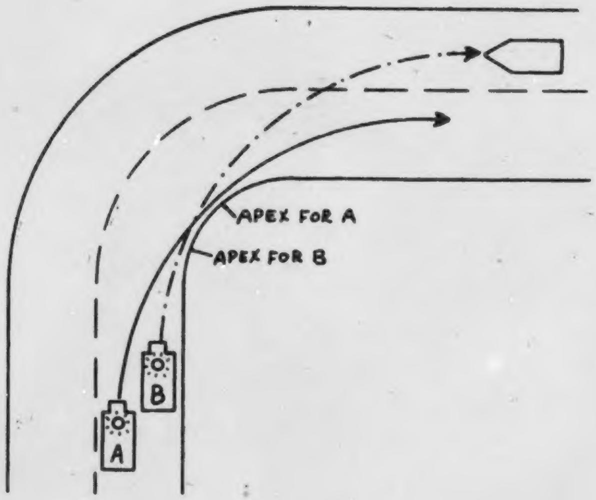
BANKED ROADS

c.


B
A
THE RADIUS AT "B" IS
MUCH SHORTER THAN THE
RADIUS AT "A".

DECREASING RADIUS CURVE

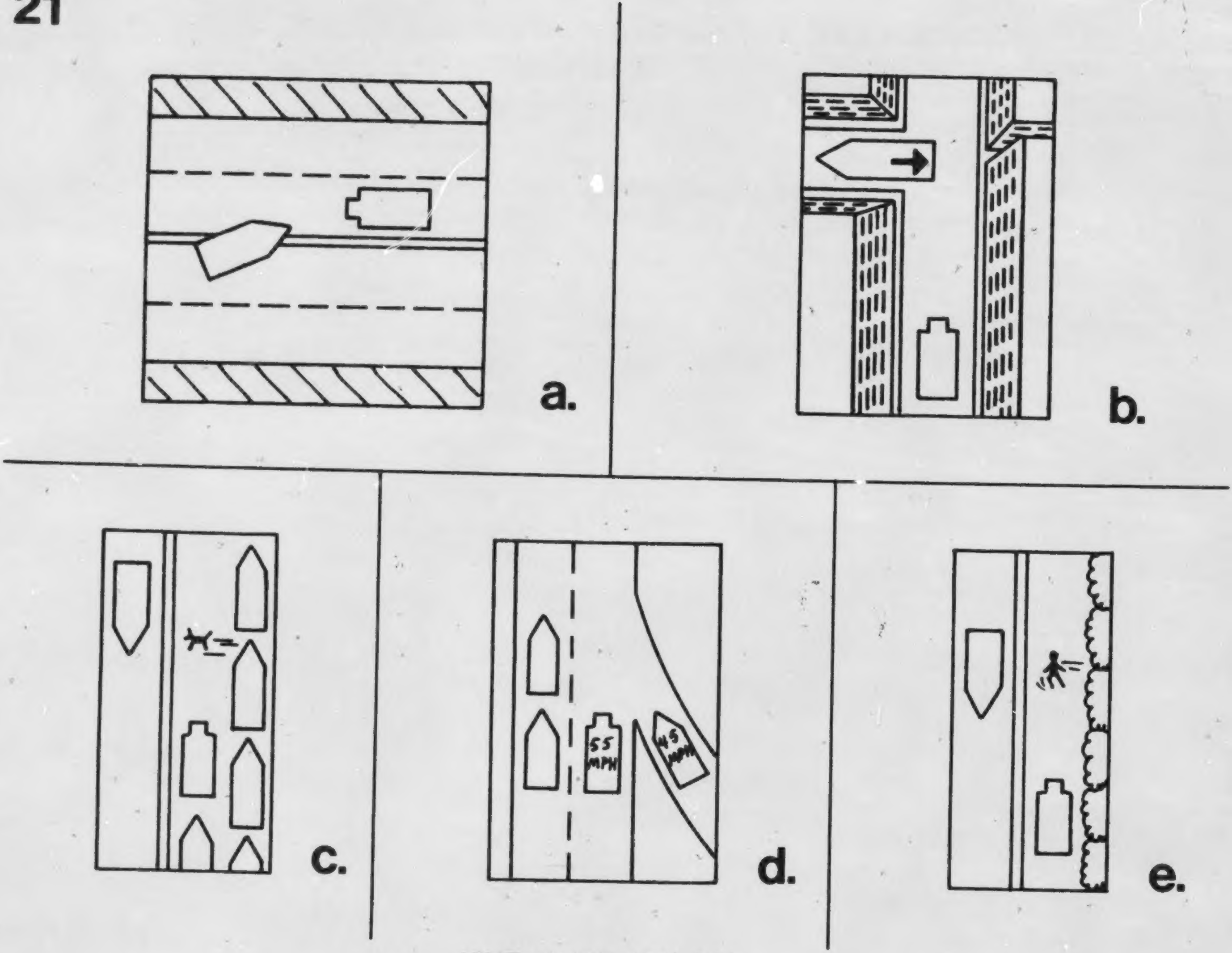
20


APEX FOR A
APEX FOR B
A
B

APEX OF CURVE

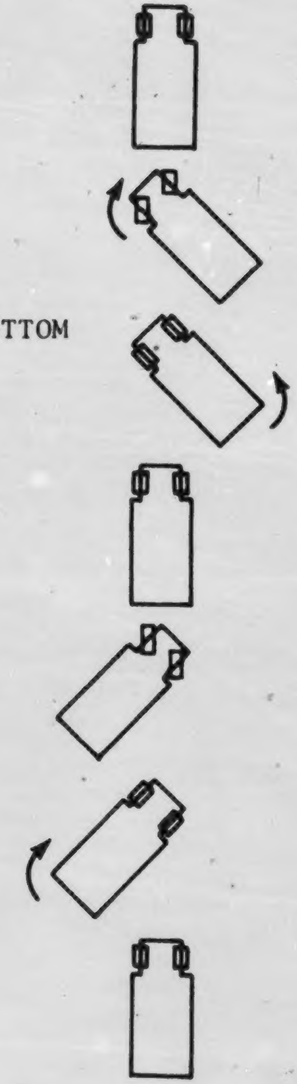
722

21


a.
b.
c.
55 MPH
45 MPH
d.
e.

WHAT WOULD YOU DO?
(PRACTICE)

READ FROM BOTTOM



7. Steering control is reestablished.

6. To control fishtailing in the opposite direction, you'd countersteer right to help you get back on course.

5. The back end fishtails to the right.

4. The vehicle is back on course.

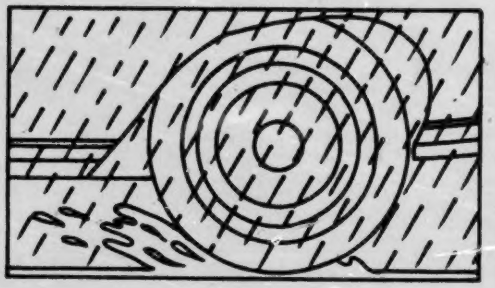
3. You'd steer left, in the direction you want the vehicle to go relative to the way it's facing.

2. The back end of the vehicle skids around to the left (the vehicle is still moving forward at an angle).

1. The vehicle is going straight.

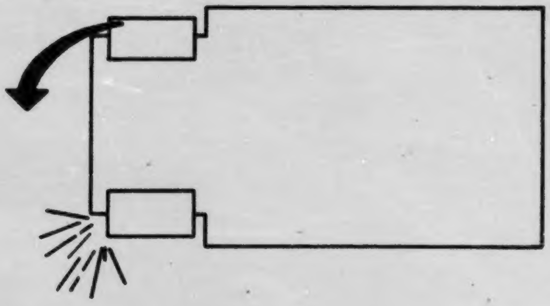
COUNTERSTEERING

23



a.

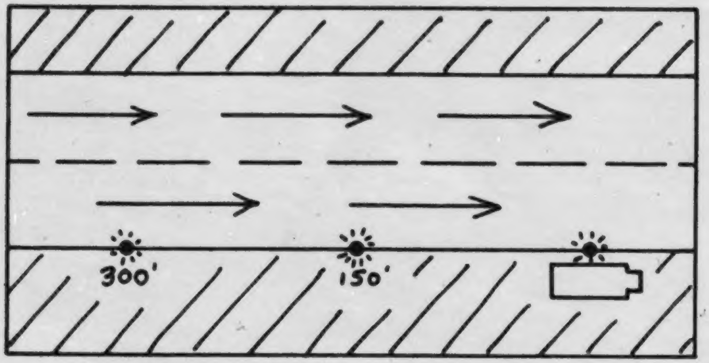
HYDROPLANING



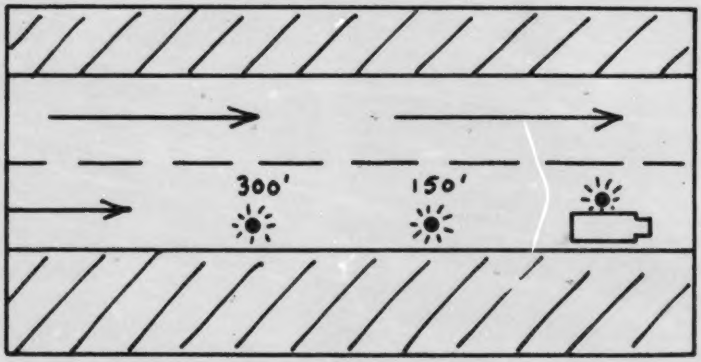
b.

BLOWOUT

24

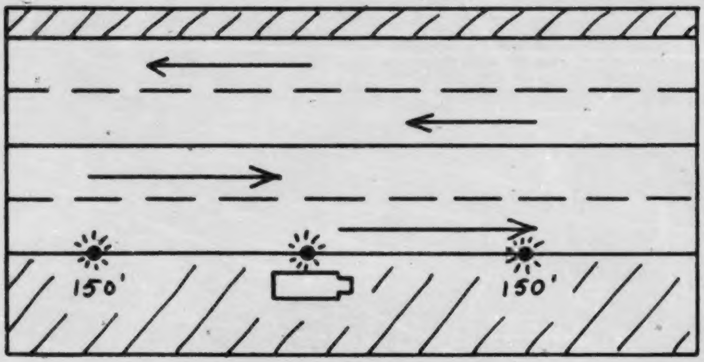


DISABLED VEHICLE OFF ROADWAY
(ONE-WAY TRAFFIC FLOW)



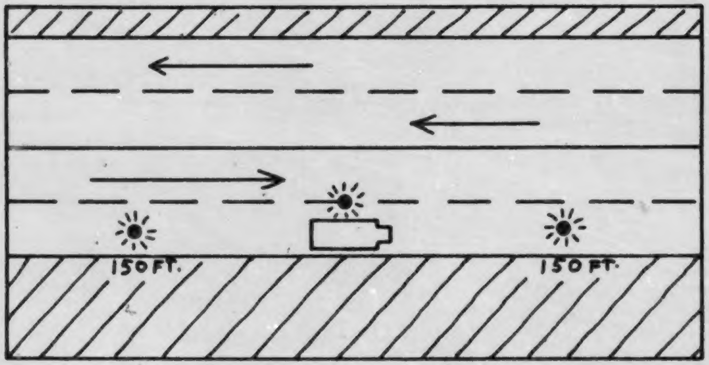
DISABLED VEHICLE ON ROADWAY
(ONE-WAY TRAFFIC FLOW)

25



a.

DISABLED VEHICLE OFF ROADWAY
(TWO-WAY TRAFFIC FLOW)


150FT.
150FT.

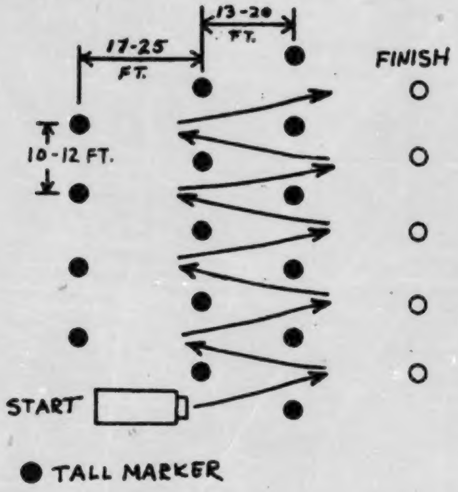
b.

DISABLED VEHICLE ON ROADWAY
(TWO-WAY TRAFFIC FLOW)

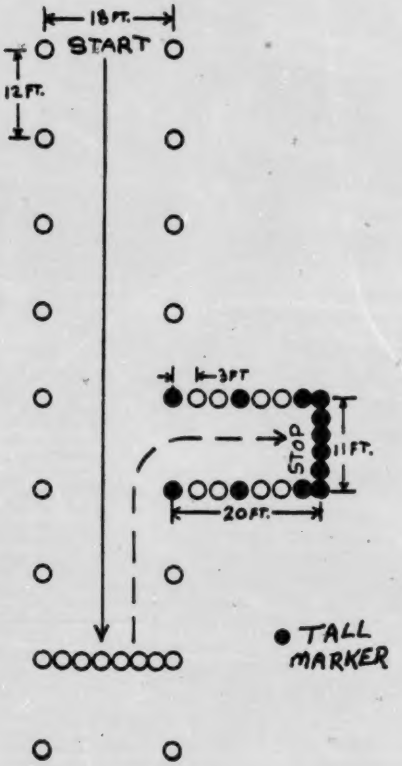
727

SMALL AREA EXERCISES

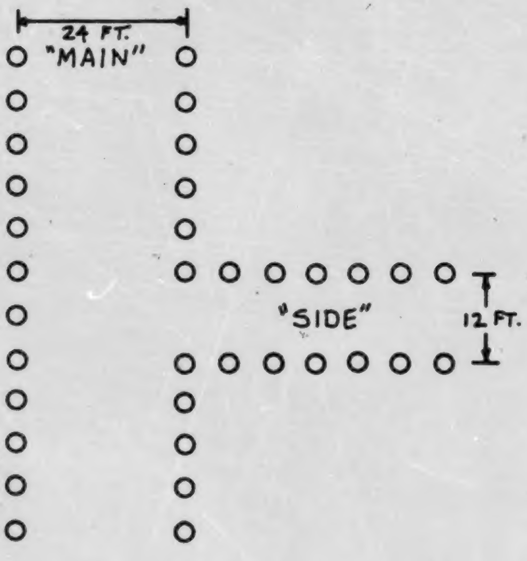
a. DUTTON'S WEAVE


13-20 FT.
17-25 FT.
FINISH
10-12 FT.
START
● TALL MARKER

b. STALL PARKING

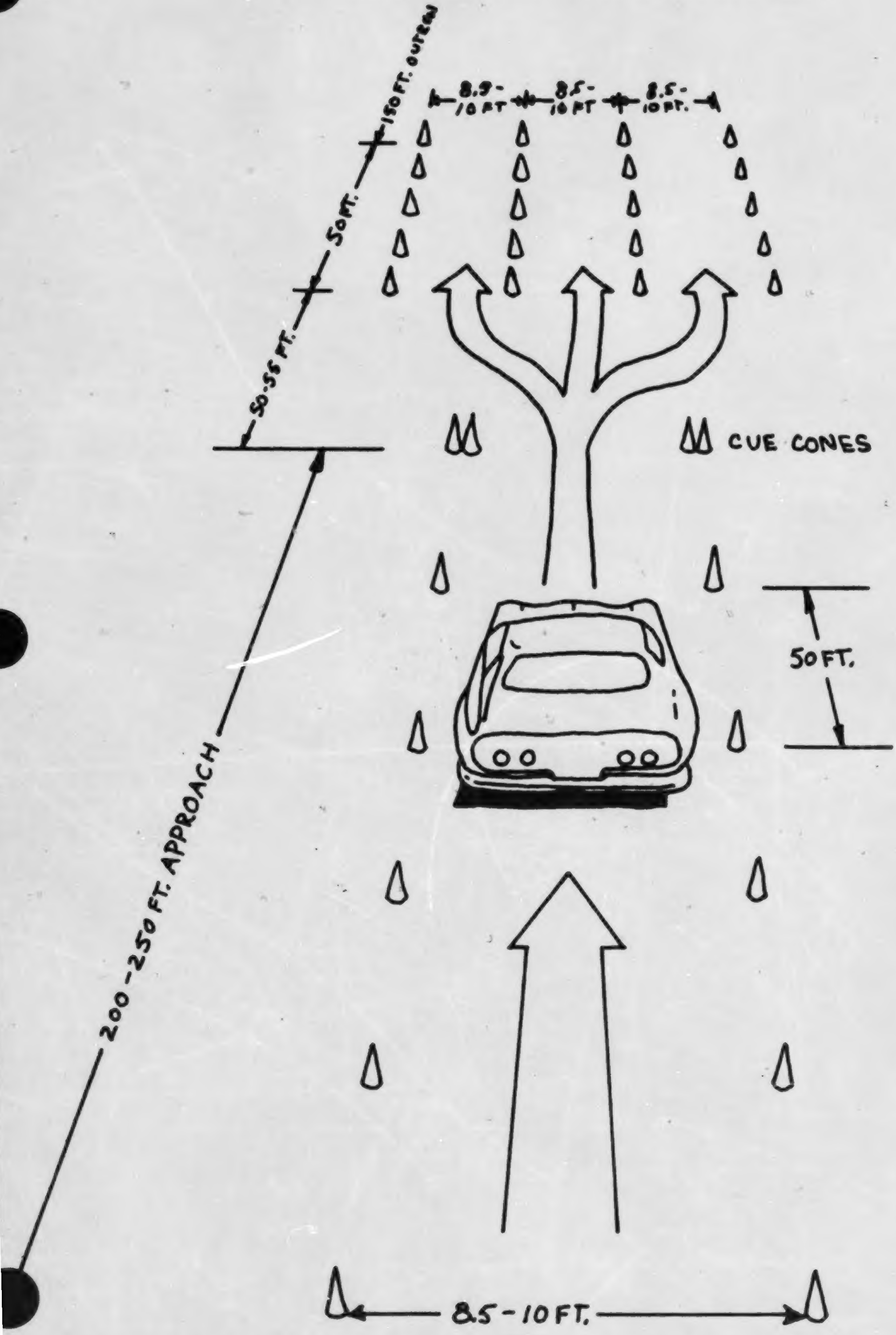

18 FT.
START
12 FT.
3 FT
STOP
11 FT.
20 FT.
● TALL MARKER

c. TURNABOUTS

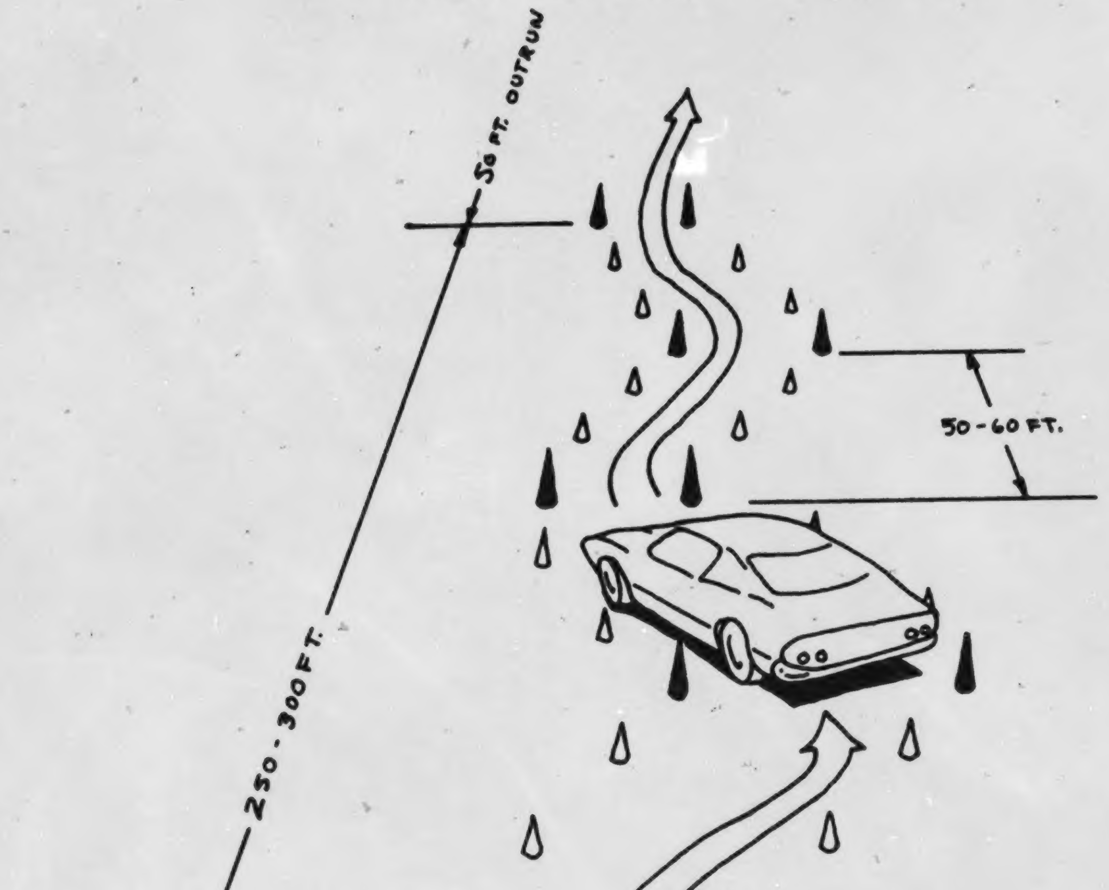

24 FT.
"MAIN"
"SIDE"
12 FT.

2-28

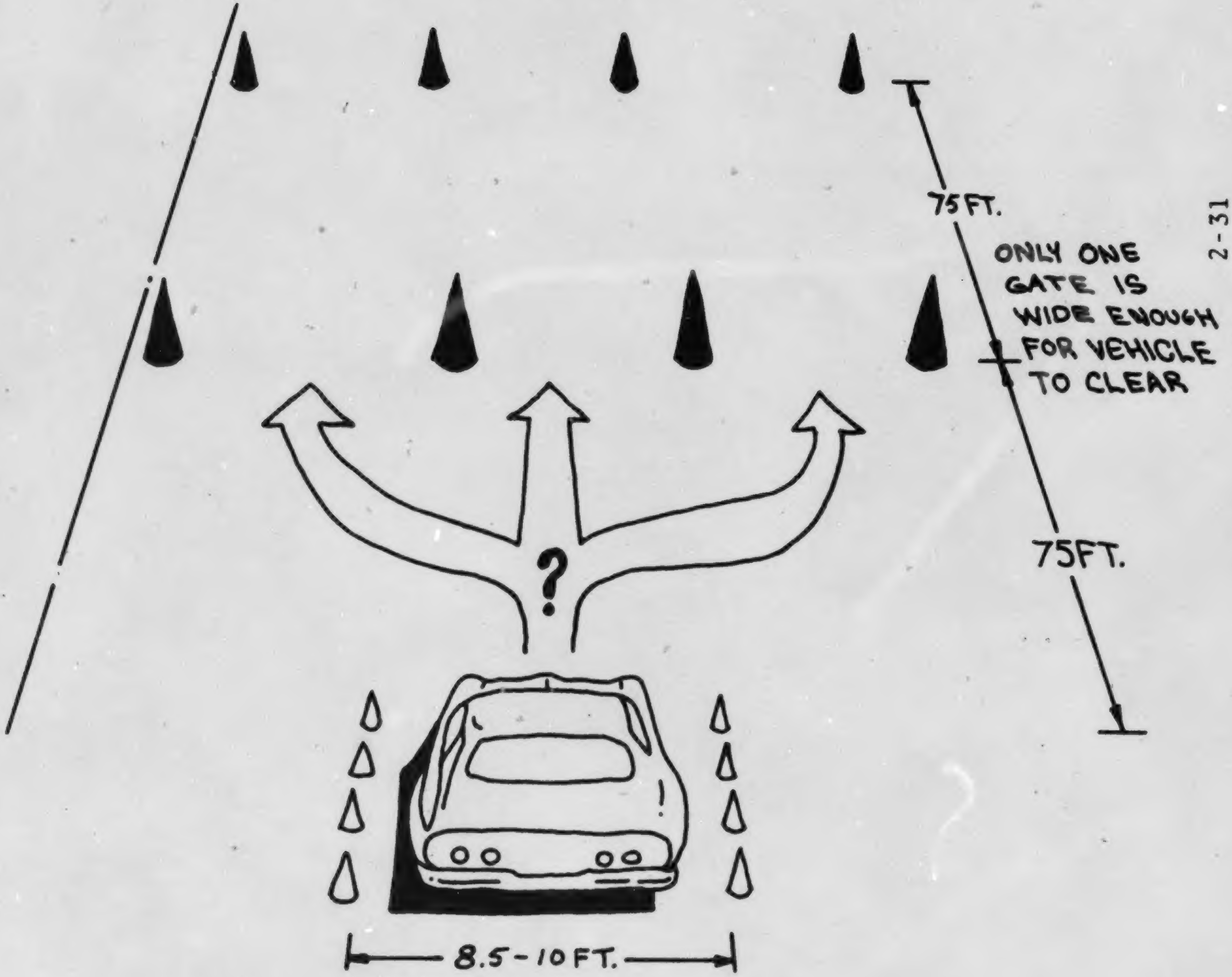
EVASIVE MANEUVER


150 FT. OUTRUN
8.5- 10 FT
8.5- 10 FT
8.5- 10 FT.
50 FT.
50-55 FT.
CUE CONES
200-250 FT. APPROACH
50 FT.
8.5-10 FT.

SERPENTINE COURSE

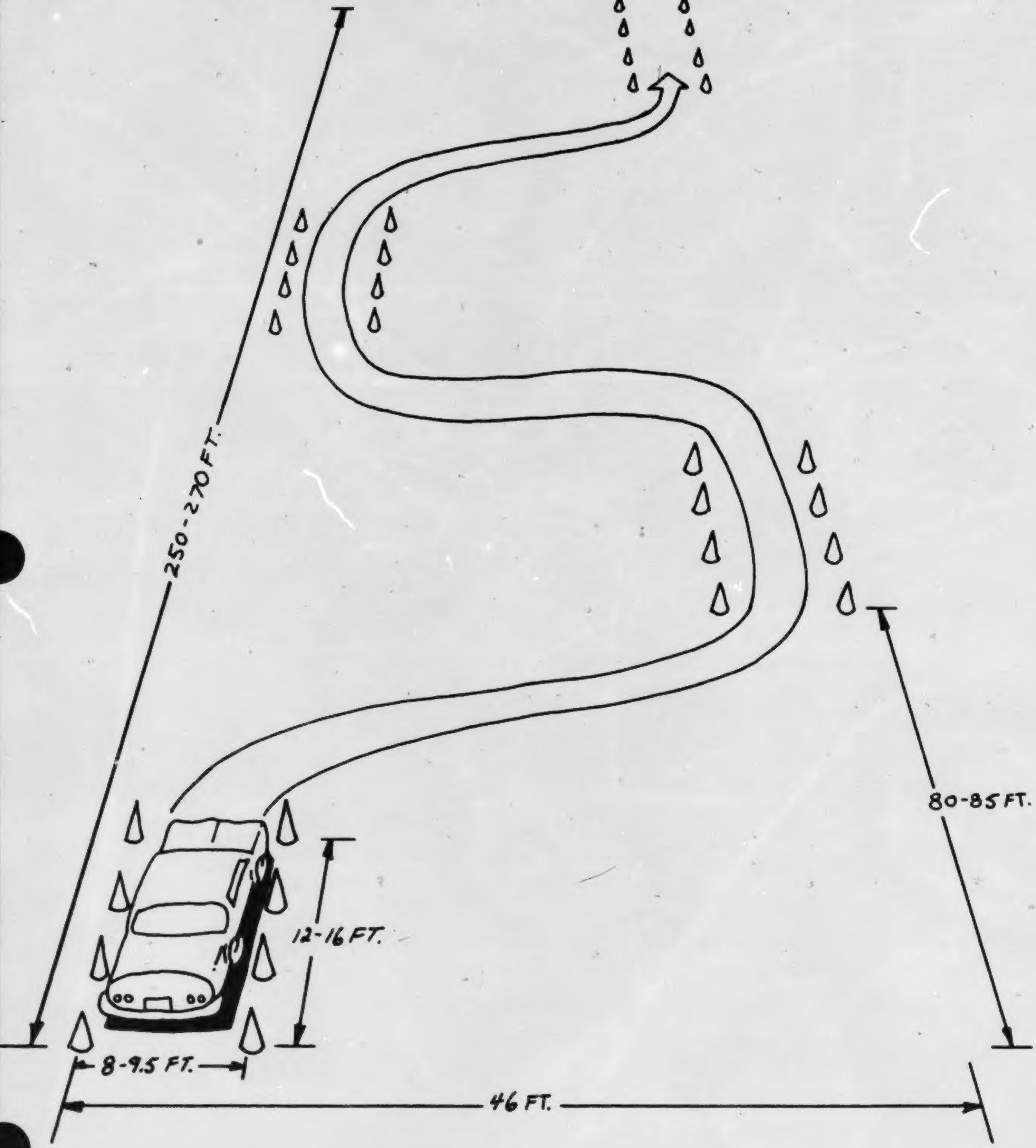

50 FT. OUTRUN
250 - 300 FT.
75 FT APPROACH
50 - 60 FT.
8.5 - 10 FT

BAIRD'S JUDGMENT


75 FT.
ONLY ONE GATE IS WIDE ENOUGH FOR VEHICLE TO CLEAR
75FT.
?
8.5-10 FT.

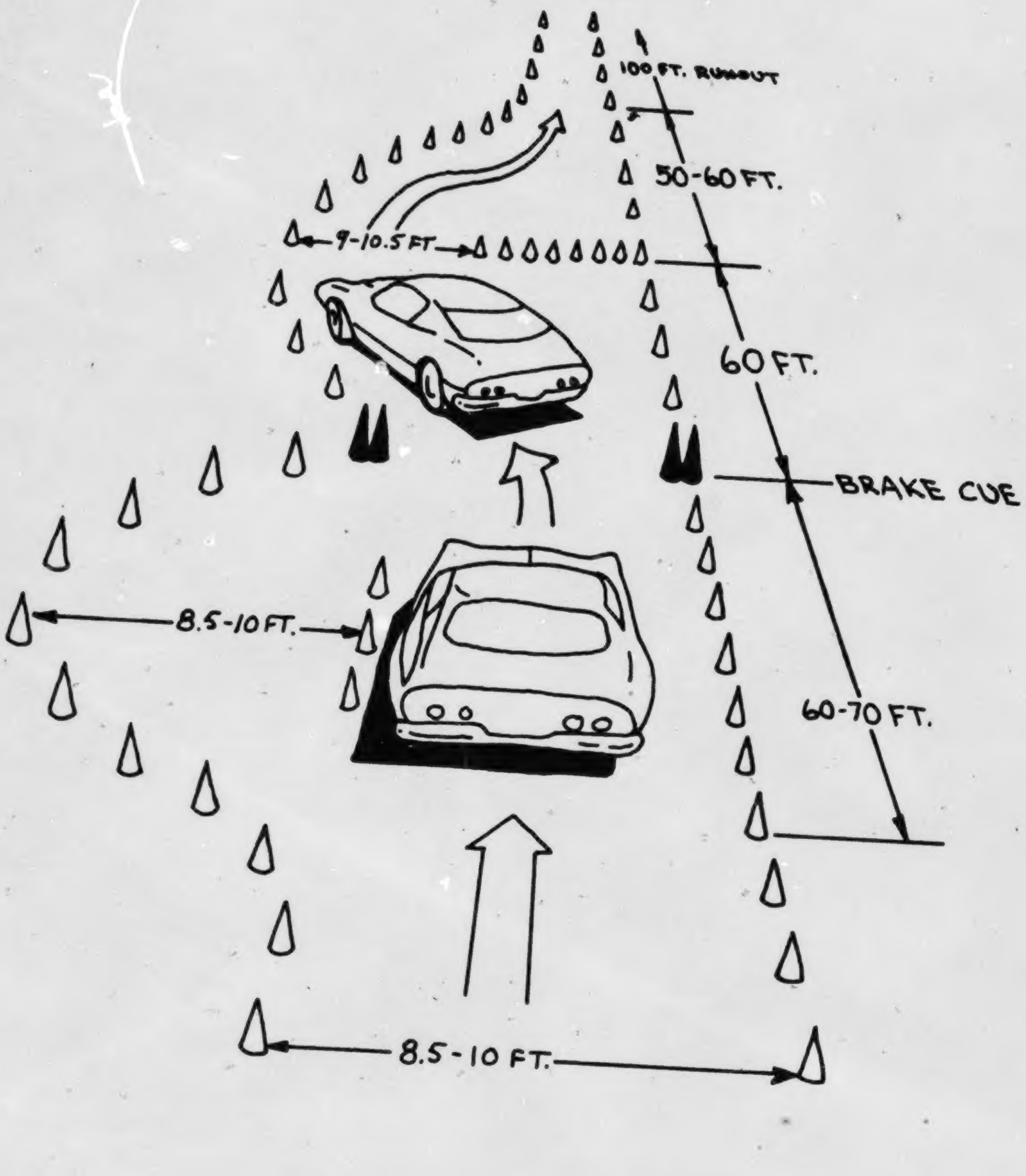
30

LANE CHANGE MANEUVER


250-270 FT.
80-85 FT.
12-16 FT.
8-9.5 FT.
46 FT.

31

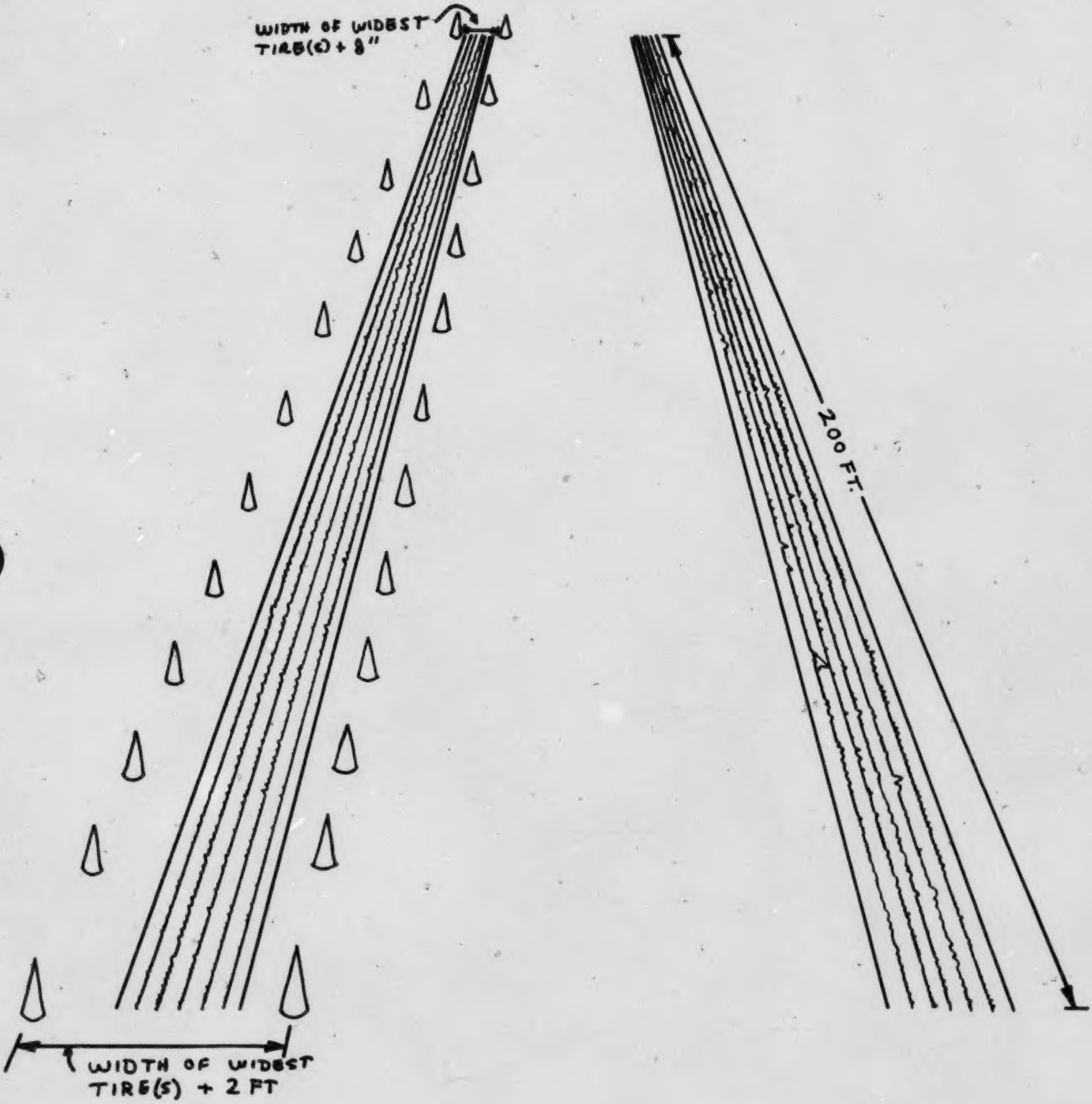
CONTROLLED BRAKING


100 FT. RUNOUT
50-60 FT.
9-10.5 FT.
60 FT.
BRAKE CUE
8.5-10 FT.
60-70 FT.
8.5-10 FT.

32

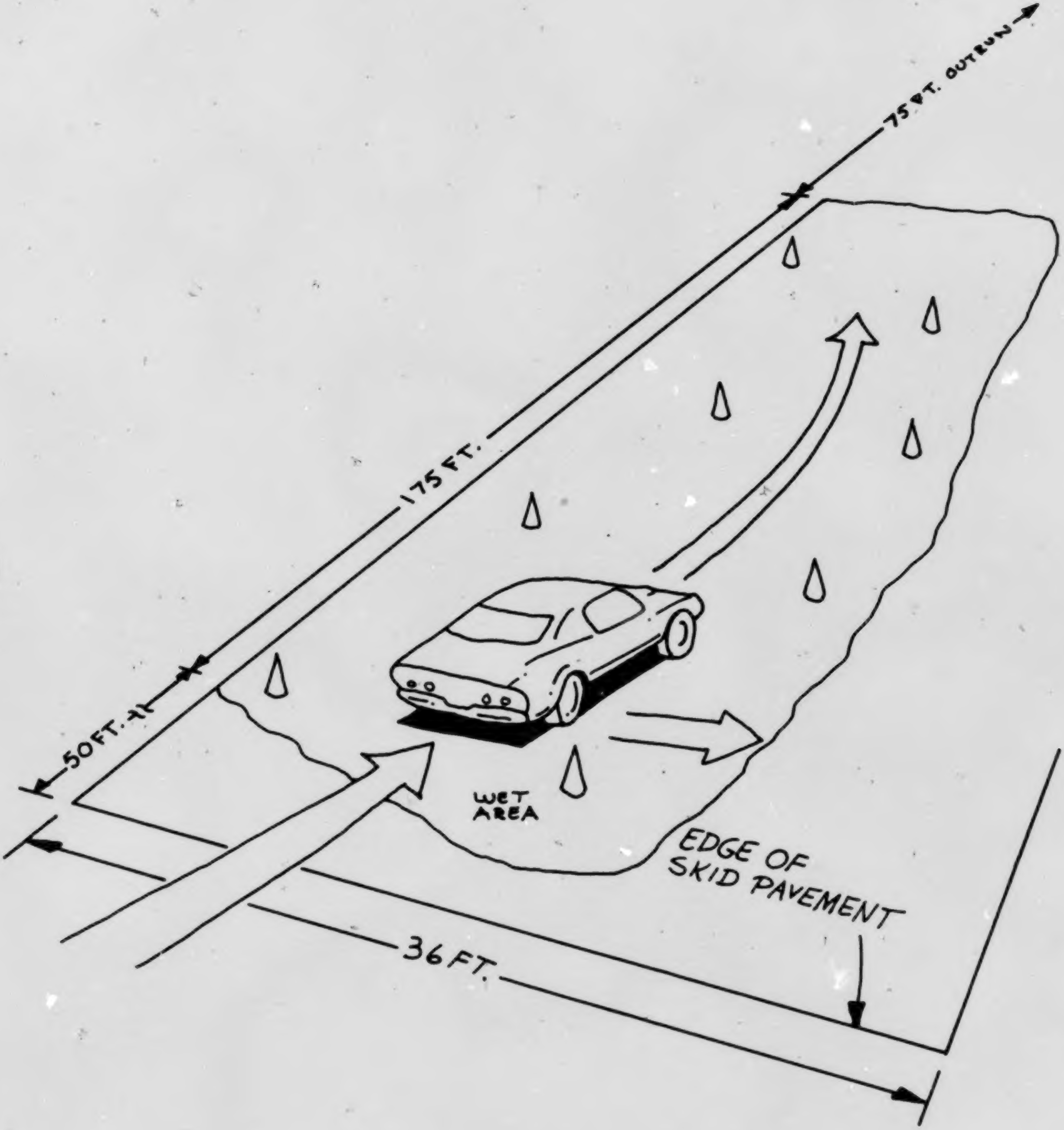
DECREASING WIDTH TRACK

(LARGE TRUCKS ONLY)


WIDTH OF WIDEST TIRE(S) + 8"
200 FT.
WIDTH OF WIDEST TIRE(S) + 2 FT

33

SKID CONTROL MANEUVER


75 FT. OUTRUN
175 FT.
50 FT.
WET AREA
EDGE OF SKID PAVEMENT
36 FT.

Training Program for Operation of Emergency Vehicles

PART III: In-Vehicle Practice

INSTRUCTOR LESSON PLANS

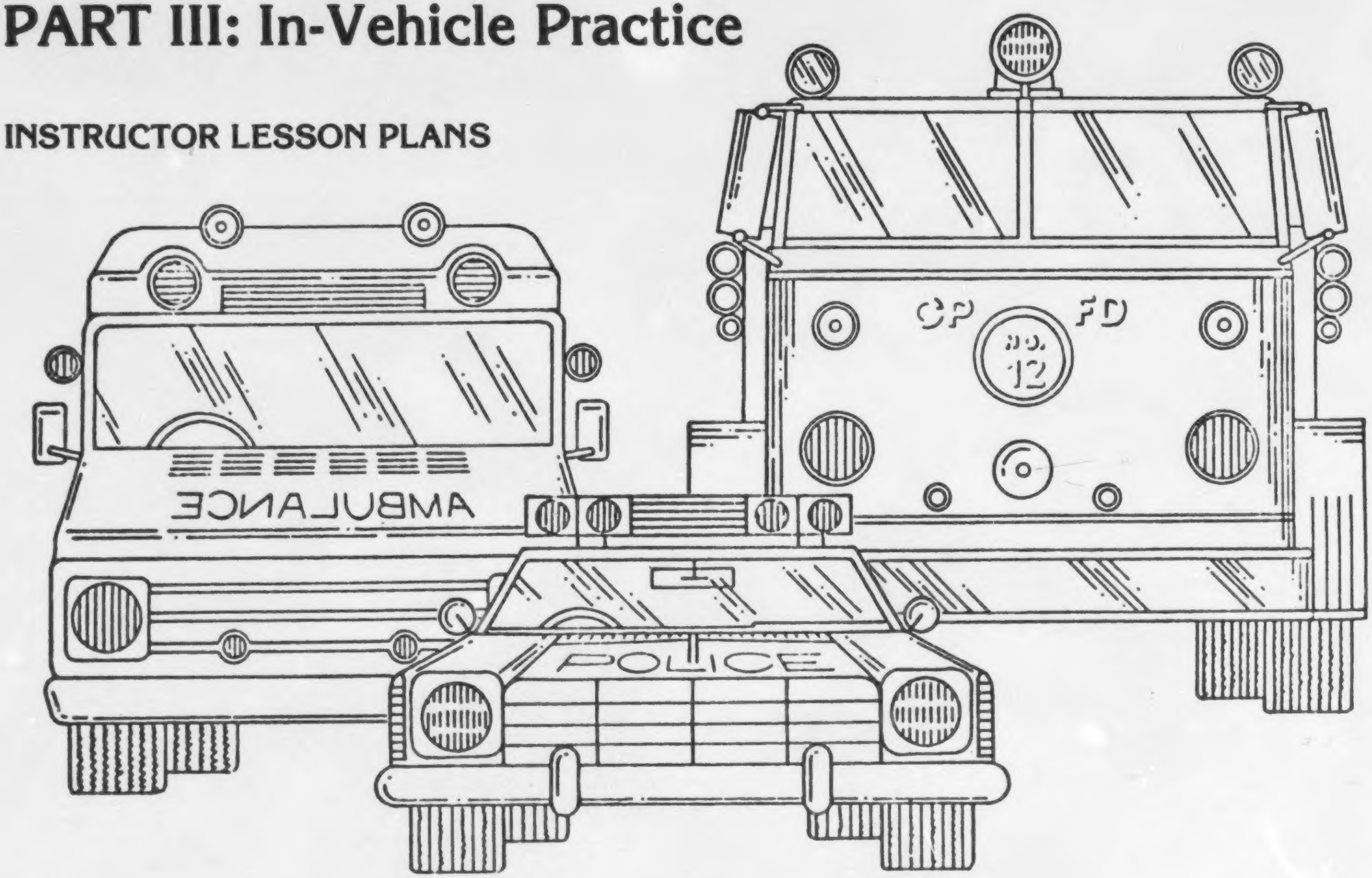

AMBULANCE
POLICE
CP
FD
NO.
12

TABLE OF CONTENTS

PART III - IN-VEHICLE PRACTICE

Description of Unit III-1
Trainee Performance Objectives III-3
Instructor Preparation Activities III-5
  Safety Rules and Regulations III-7
  Organization and Arrangement of Facilities III-7
  Procedure for Each Maneuver III-7
  Grading Standards III-7
  Small-Area Exercises III-8
  Range Exercises III-11
  Skid Pad Exercise III-17

Description of Unit

Part III of this curriculum is different from Parts I and II. The majority of this section is devoted to practical (in-vehicle) exercises; trainees will practice and demonstrate their ability to operate an emergency vehicle. Three important points for you to remember:

1. There is no Trainee Study Guide for this part of the course, since the majority of learning activity occurs in the vehicle.

2. It is assumed that you are qualified by prior experience and/or training to teach in-vehicle maneuvers.

3. Trainees should practice in the same type of vehicle they will operate on the job (independent of their emergency service).

Classroom Portion

The purpose of the classroom portion of Part II is to provide an overview of the in-vehicle practical exercises:

1. Organization and arrangement of facilities.

2. Safety rules and regulations.

3. Procedure for each maneuver.

4. Grading standards.

In-Vehicle Portion

The trainees will practice three discrete sets of exercises:

1. Small area exercises - designed to provide practice in judging clearances and in backing up.

2. Range exercises - designed to build proficiency in all basic control tasks.

Description of Unit (Continued)

3. Skid pad exercises - designed to provide practice in skid-control techniques.

4. Observers - Students not under instruction or assisting in course set-up, should ride in the vehicles as observers. Those students assigned to ambulance should take turns riding on the cot as a "patient" to experience patient exposure.

Trainee Performance Objectives

By the end of Part III, the trainees will demonstrate proficiency in small area, range, and skid pad maneuvers. Proficiency will be assessed on the basis of:

1. Correctness of the procedure.
2. Smoothness of the maneuver (instructor rating).
3. Whether the maneuver was completed without knocking over any cones.
4. Speed in MPH for completing the maneuver (range exercises only).

Specific maneuvers to be demonstrated are:

1. Small Area:
    a. Dutton's Weave (sedan and van only).
    b. Turnabouts
    c. Stall Parking (van only).
2. Range Exercises:
    a. Evasive Maneuver.
    b. Serpentine.
    c. Baird's Judgment.
    d. Lane Change.

Trainee Performance Objectives (Continued)

   e. Controlled Braking.

   f. Decreasing-Width Track (large truck only).

3. Skid Pad Exercise (sedan only).

Instructor Preparation Activities

Classroom

1. Preparation for page III-7. Compose and reproduce as a handout, a complete list of Safety Regulations for the driving range area. The safety regulations must be keyed to your local requirements. Possible regulations include:
   a. EVs, when being run through maneuvers, will use either headlights or emergency lights.
   b. No unauthorized vehicles on range during exercises.
   c. All EV occupants will wear occupant restraints and safety helmets on the driving range.
   d. Persons assigned to set up cones will wear bright clothing and stand well off the paved area.
   e. Fire extinguishers will be carried in all range vehicles.
2. Preparation for pages 8 through 18. Make transparancies (or sufficient paper copies) of the in-vehicle exercise. Use the Masters of Transparancies in Appendix 2 (Nos. 26-33).
3. Make a sketch of the overall layout of the driving range. The sketch should be of sufficient detail to show buildings and other landmarks, and to show the sequence of the maneuvers. (The Transparancy Masters in Appendix 2 indicate a suggested sequence for the exercises.)

Equipment: Chalkboard and chalk; overhead projector.

Materials: Enough copies of Safety Regulations and sketch of layout for all trainees; Transparancies No. 26 through 33.

In-Vehicle Practice

1. Review the sections of the Course Guide relating to driving range training.

2. Set up all exercises on the driving range. Try out each one at entry-level (first run) speed, and at the maximum speed (that required for "Excellent Rating"). Remember:

   a. The dimensions given on the drawings will work for most EVs. The shorter distances are for sedans and the longer distances are for larger EVs; you may need to adjust these distances for specific vehicles.

   b. The speeds given for the range exercises were established for a specific set of vehicles (those used in the pilot test of this curriculum). These vehicles were equipped with retread bias-ply tires, and the driving range had a "popcorn asphalt" surface. You may need to adjust these speeds on the basis of driving range surface, vehicle suspension, or the type of tires used on the vehicles. NOTE: "First-run" speed should be attainable by most (but not all) of your trainees before training.

   c. After you have established the proper cone spacing and speed requirements, mark cone positions with a dot of spray paint. A second color can be used to indicate placement of tall cones.

3. The skid pad exercise requires a vehicle equipped with a roll bar. Ideally, the skid vehicle will have slick tires and be equipped with a separate rear-wheel brake which can be activated by the instructor from the right-front seat. Two options exist for increasing the extent of skid:

   a. Use a series of cones arranged 50' apart in a straight line (instead of the pictured, curved lane) and have trainees drive a serpentine through the cones.

   b. Apply to the surface any of the commercially available substances designed to increase slipperiness.

4. If more than one range instructor will conduct the program, it is important for all instructors to apply consistent and similar grading criteria. The best way to accomplish this is for instructors to "teach" one another after the course has been laid out.

Equipment: See Course Guide.

Materials: See Course Guide.

UNIT TITLE	IN-VEHICLE PRACTICE	**UNIT PAGE**	III-7

INSTRUCTIONAL CONTENT / PRESENTATION GUIDELINES	**NOTES**
SAFETY RULES AND REGULATIONS	
-Distribute list of safety rules and regulations. Discuss each safety rule.	
ORGANIZATION AND ARRANGEMENT OF FACILITIES	
-Distribute a copy of the physical layout of the range to each trainee; describe the sequence of the exercises.	
PROCEDURE FOR EACH MANEUVER	
-Review the procedure for each maneuver (from the following ten pages).	PRESENT TRANSPARANCIES 26 THROUGH 33.
GRADING STANDARDS	
-Explain how grading will occur and the standards for grading	

SMALL-AREA EXERCISES

Dutton's Weave*

A. Description: This exercise will provide practice in precise forward and backward control of the EV in cramped quarters, at low speed. It will illustrate proper backing techniques and the use of mirrors to judge rear and side clearances.

B. Procedure:

1. This is a 60-second, timed event.
2. The EV is driven alternately forward and backward in the pattern indicated on the drawing.
3. EV should stop approximately 1' from the outer row of cones before changing direction.

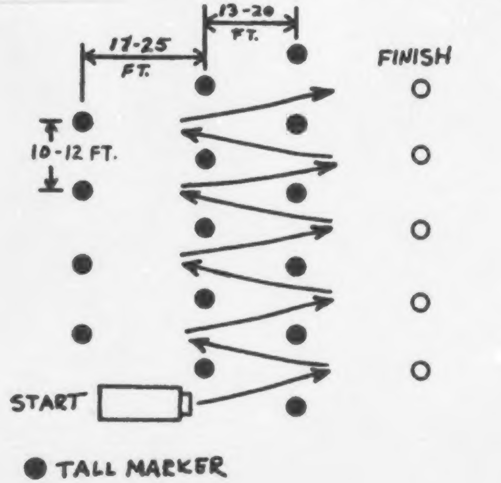
C. Possible Performance Problems:

1. Over or understeering.
2. Steering in the wrong direction (in "Reverse").
3. Difficulty using mirrors to judge position.
4. Vehicle not centered in relation to outer rows of cones.
5. Driving too slowly (not completing in 60 seconds).

D. Criteria for Excellent Rating (3 Error-Free Runs):

1. Completed in 60 seconds or less.
2. All cones standing.

26a. DUTTON'S WEAVE



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*This exercise is recommended for sedans and vans only.

Stall Parking *

A. Description: This exercise provides the van or modular EV operator with practice in backing the EV into a stall such as an Emergency Room loading ramp. It illustrates the proper procedure for stall parking and, through the use of cones, the most important cues to look for.

B. Procedure:

1. The EV is driven beyond the "stall" (which is perpendicular to the main "road").
2. A "partner" is stationed against the far wall of the stall to provide guidance.
3. The EV is backed into the center of the stall.

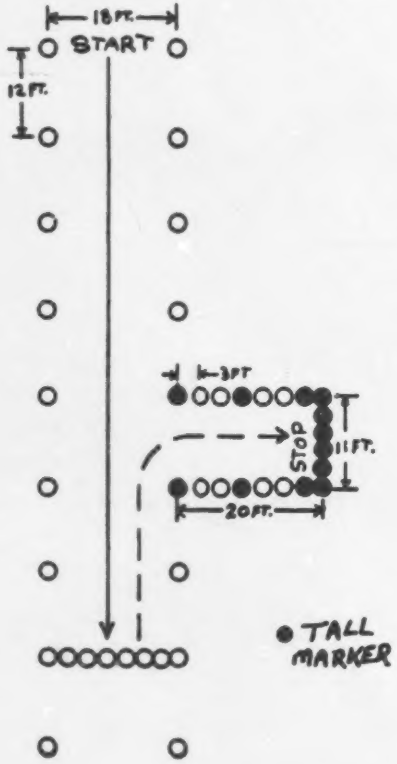
C. Possible Performance Problems:

1. Over or understeering in reverse.
2. Relying on mirror when partner can provide better information.

D. Criteria for Excellent Rating:

1. EV positioned in center of stall.
2. Rear of EV stopped within 1' of rear stall markers.
3. All cones standing.

26b. STALL PARKING



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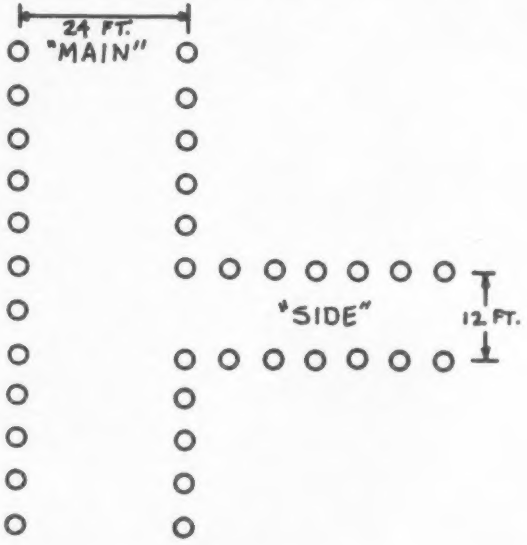
*Van only.

Turnabouts

A. Description: This exercise provides trainees with practice in performing turnabouts using left and right-hand side roads. Cones are used to outline the "roads," but any intersection on the driving range could be used.

B. Procedure/Criteria: The procedure for turnabouts is illustrated on Transparencies 14 and 15 and explained on pages I-F-44 through I-F-47.

26c. TURNABOUTS



RANGE EXERCISES

Evasive Maneuver

A. Description: This exercise provides practice in the proper techniques for executing an evasive maneuver. It will demonstrate that, using proper handling techniques, an operator can avoid an obstacle in a short distance (even at high speed). It will also illustrate that panic-braking often requires more distance than an evasive maneuver.

B. Procedure:

1. Establish proper entry speed and maintain throughout (25 mph for first run).
2. Use 3 and 9 o'clock hand position on sedan steering wheel.
3. At cue cones, Instructor indicates "Left," "Right," or remains silent. Vehicle operator:
   a. Selects correct lane (NOTE: If Instructor remains silent, center lane is correct).
   b. Steers to and through proper lane.

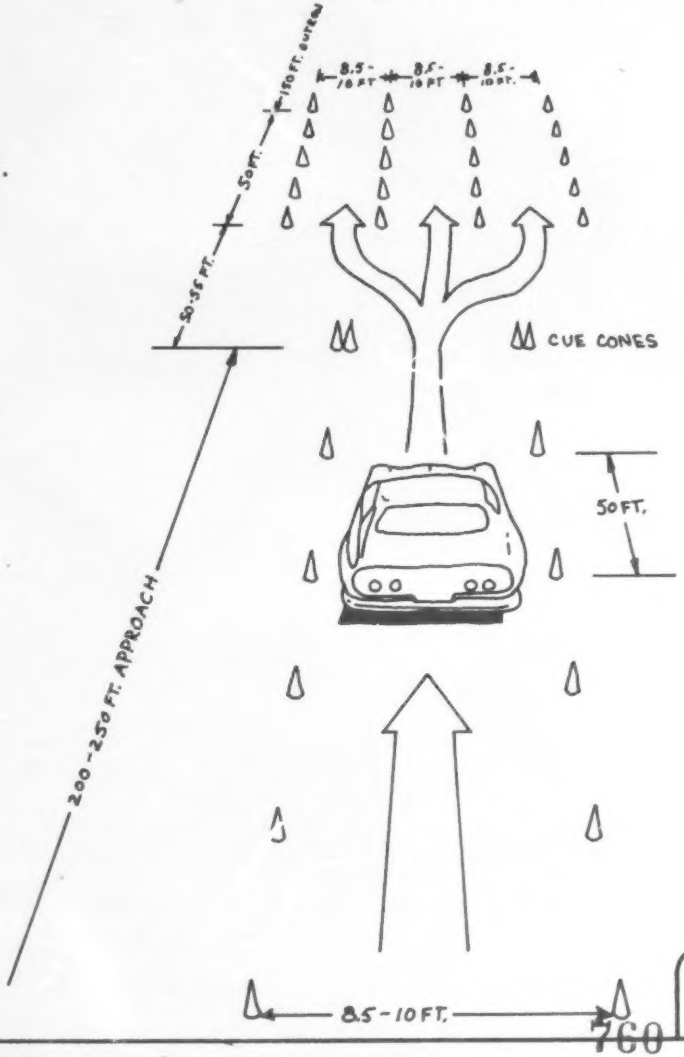
C. Possible Performance Problems:

1. Slow reaction to command.
2. Anticipating Instructor's command.
3. Under or oversteering.

D. Criteria for Excellent Rating (3 Error-Free Runs)

1. Speed: 45 mph throughout.
2. Correct lane selection.
3. All cones standing.

EVASIVE MANEUVER



Serpentine Course

A. Description: This exercise provides practice in directional control. It will demonstrate that throttle control and timing affect the ability to steer.

B. Procedure:

1. Establish proper entry speed and maintain throughout (20 mph for first run).
2. Steer so that vehicle passes closest to black (pivotal) cones on the inside of curves.
3. Establish rhythm in throttle use and steering input, such that weight transfer is smooth and equivalent throughout exercise.

C. Possible Performance Problems:

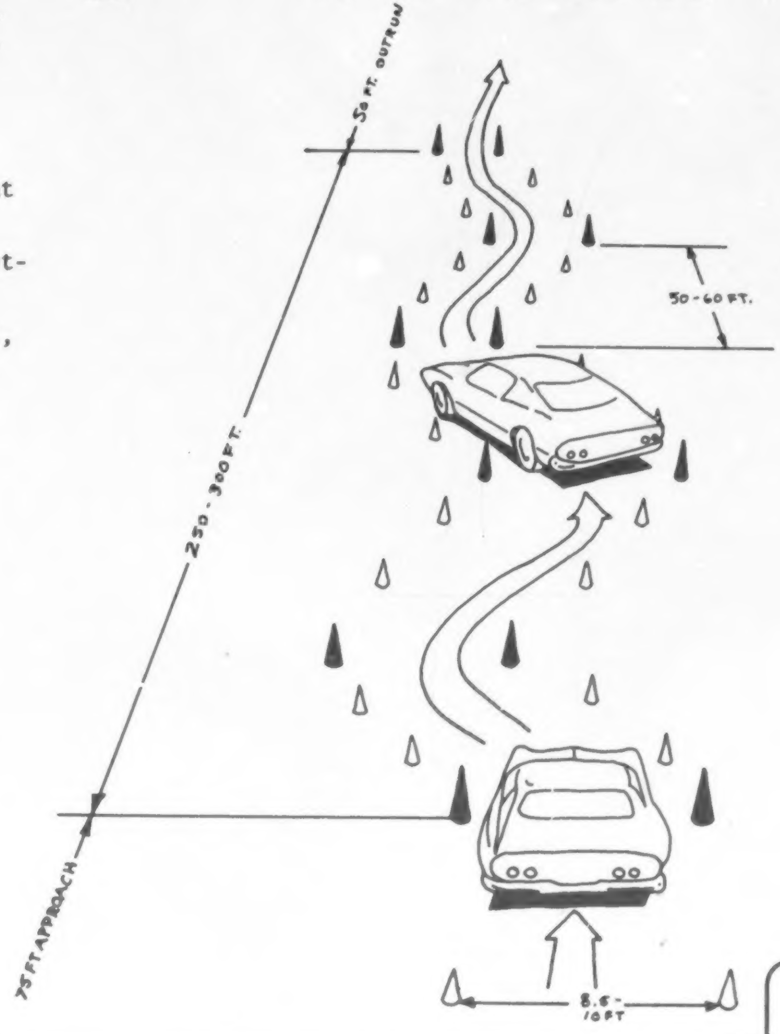
1. Improper entry angle.
2. Under or oversteering.

D. Criteria for Excellent Rating (3 Error-Free Runs):

1. Speed: 25 mph throughout.
2. Smooth, rhythmic control.
3. All cones standing.

28

SERPENTINE COURSE



Baird's Judgment

A. Description: This exercise provides practice in judging clearances. It will illustrate that even small differences in gap size can be visually detected.

B. Procedure:

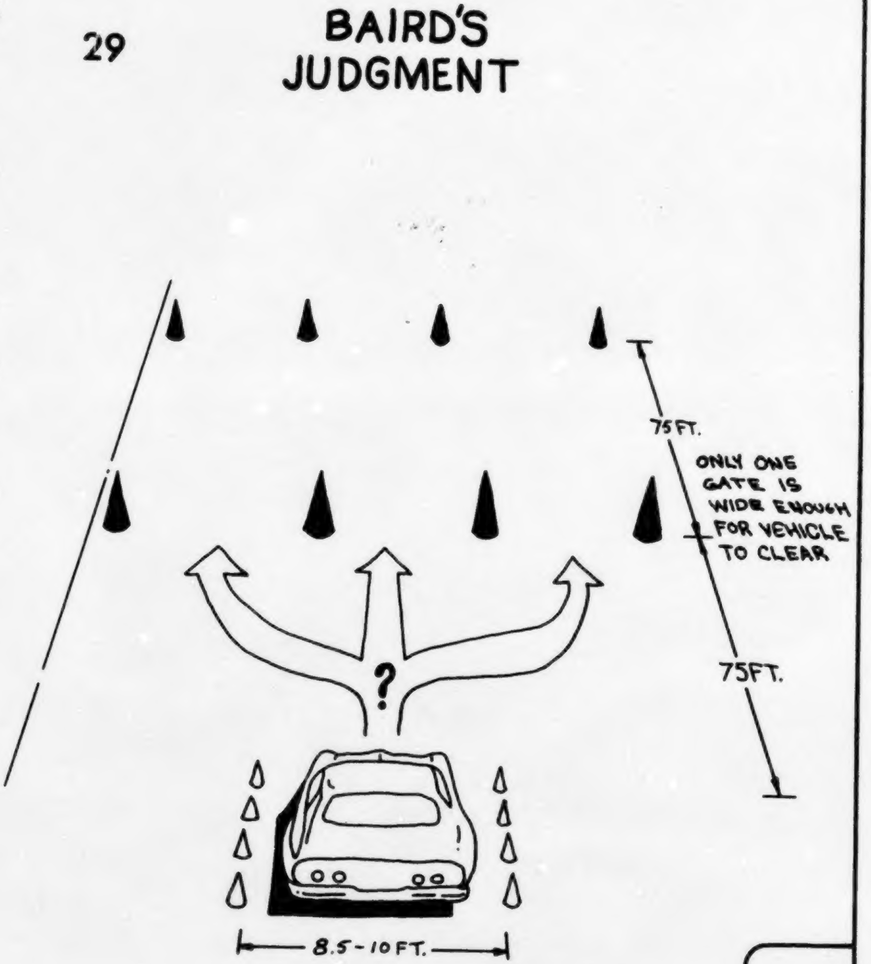
1. Before each run-through, one of the two center cones in each row is moved about 6" to the right or left. Moving the cone will leave only one of the three gates sufficiently "open" for the EV to clear.
2. Establish proper entry speed and maintain throughout (35 mph for first run).
3. Steer so that vehicle passes through largest gate in each row of cones.

C. Possible Performance Problems:

1. Reacting too slowly.
2. Correct selection of gate, but consistently hitting either the right or left cone.

D. Criteria for Excellent Rating (3 Error-Free Runs)

1. Speed: 45 mph throughout.
2. All cones standing.



Lane Change Maneuver

A. Description: This exercise provides practice in making 90° turns, and in establishing a proper approach for precise alignment through lanes.

B. Procedure:

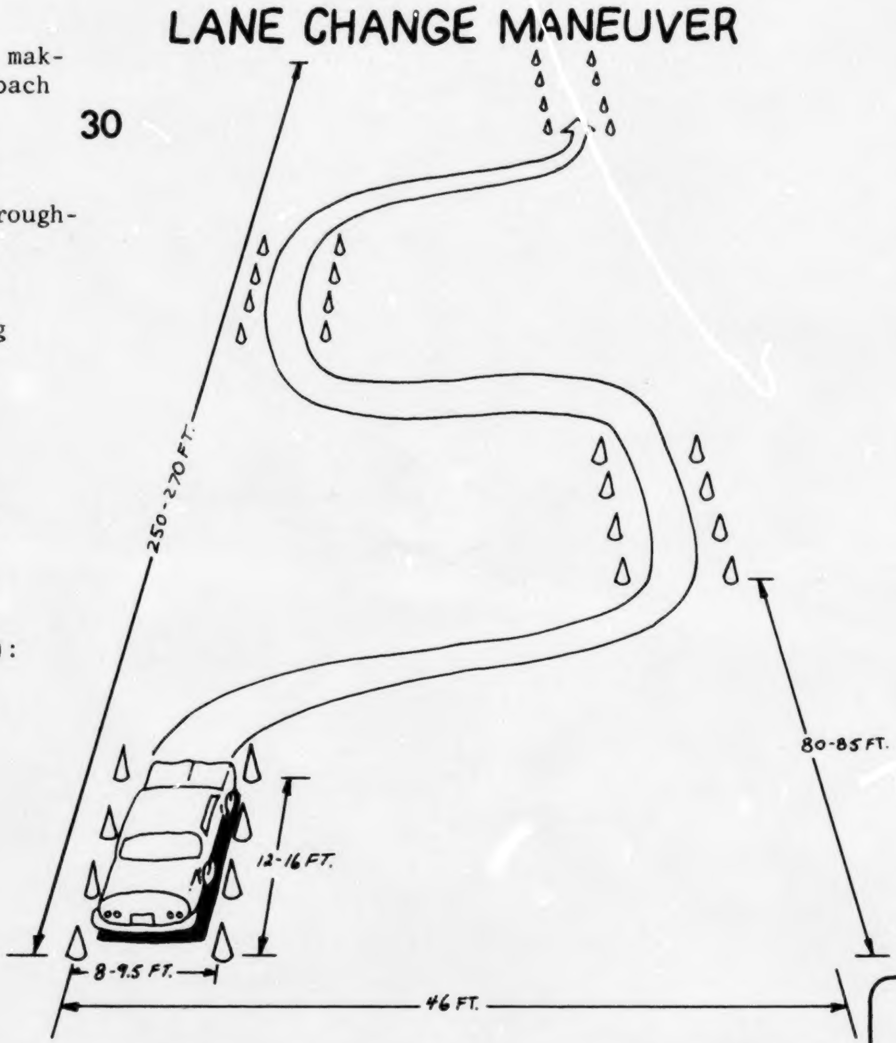
1. Establish proper entry speed and maintain throughout (20 mph for first run).
2. Follow track indicated on illustration.
3. Use 3 and 9 o'clock hand position on steering wheel.
4. Use overhand method for turning wheel.

C. Possible Performance Problems:

1. Speed fluctuation.
2. Beginning turns too early or too late.
3. Under or oversteering.

D. Criteria for Excellent Rating (3 Error-Free Runs):

1. Speed: 25 mph throughout.
2. All cones standing.



Controlled Braking

A. Description: This exercise provides practice in performing a maximum braking stop while maintaining directional control. It will also provide practice in determining the braking point just before wheel lockup and will illustrate that steering with locked wheels is impossible.

B. Procedure:

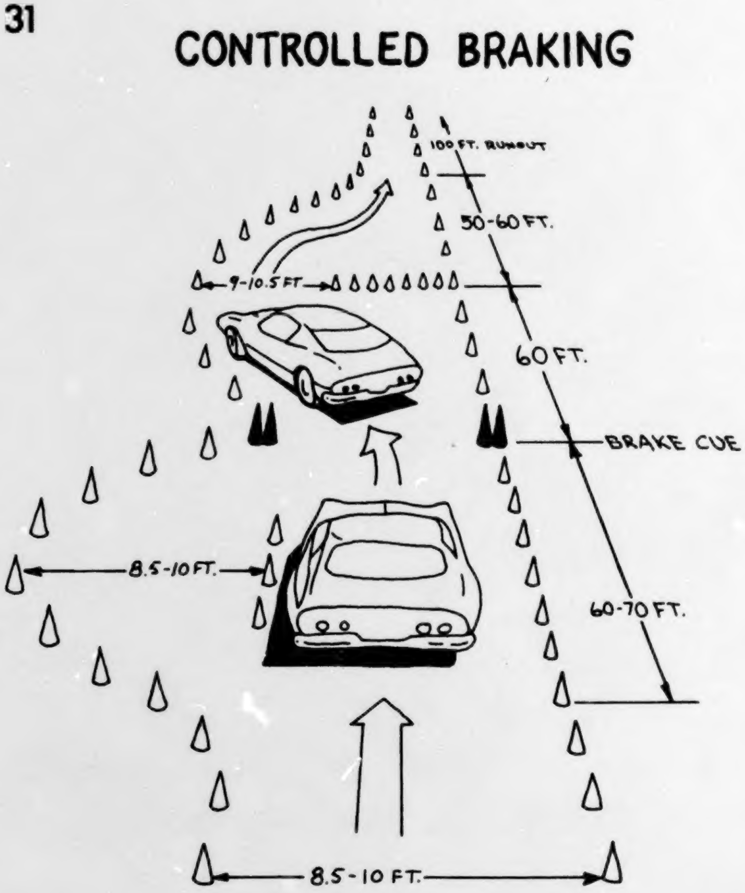
1. Establish proper entry speed (30 mph for first run).
2. Approximately 80' before brake cue cones, Instructor indicates "Left" or "Straight." Vehicle operator:
    a. Steers in direction indicated by Instructor.
    b. Applies brakes as front of EV reaches cue cones.
    c. Steers left around barricade without loss of directional control.
    d. Returns to lane and stops in first 20' of runout.

C. Possible Performance Problems:

1. Anticipating Instructor's command.
2. Braking before cue.
3. Locking wheels (loss of directional control).
4. Over or understeering.

D. Criteria for Excellent Rating (3 Error-Free Runs):

1. Speed: 45 mph.
2. Stop within 20' of runout.
3. All cones remain standing.



Decreasing-Width Track*

A. Description: This exercise provides trainees with practice in negotiating a narrow track with a large EV.

B. Procedure:

1. Establish proper entry speed and maintain throughout (25 mph for first run).
2. Drive the front and rear wheels of the left side through the decreasing-width track.

C. Possible Performance Problems:

1. Misalignment at start of track.
2. Speed fluctuation.

D. Criteria for Excellent Rating (3 Error-Free Runs):

1. Speed: 35 mph throughout.
2. All cones standing.

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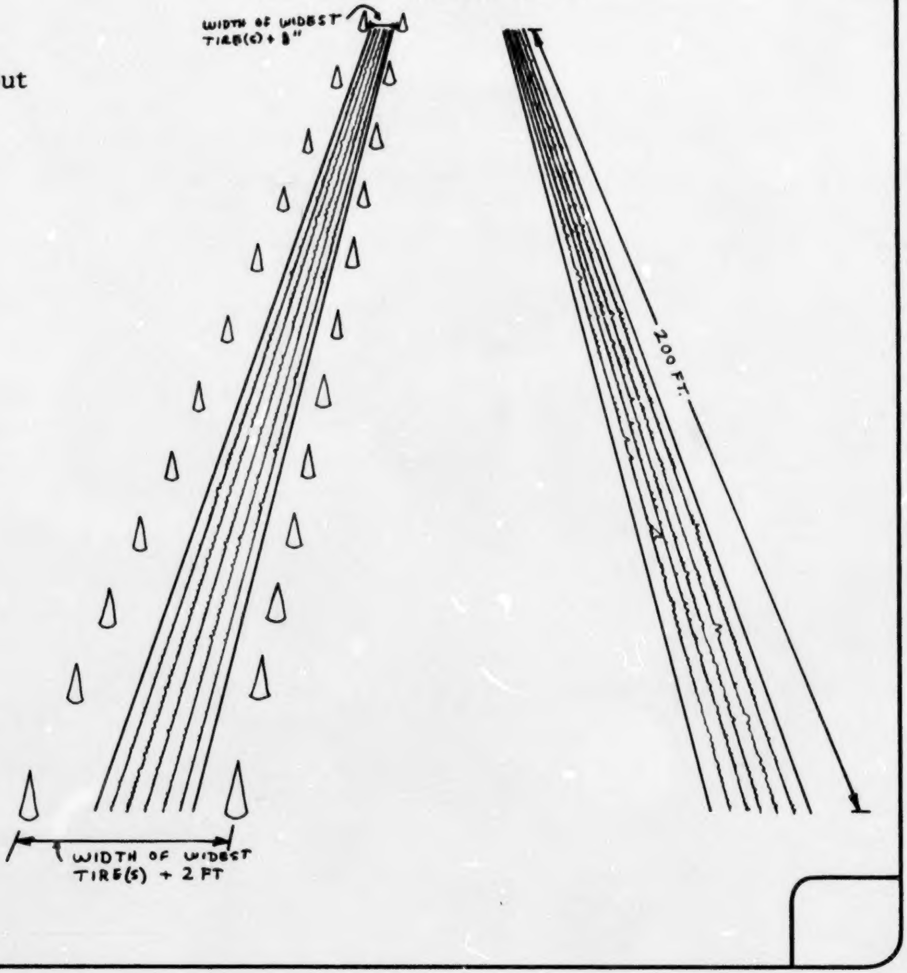

DECREASING WIDTH TRACK
(LARGE TRUCKS ONLY)

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*Large truck only.

SKID PAD EXERCISE*

Skid Control Maneuver

A. Description: This maneuver provides practice in controlling rear-wheel and four-wheel skids.

B. Procedure:

1. Establish entry speed (25 mph for first run).
2. Follow the lane indicated by the cones.**
3. Use appropriate skid-recovery techniques.

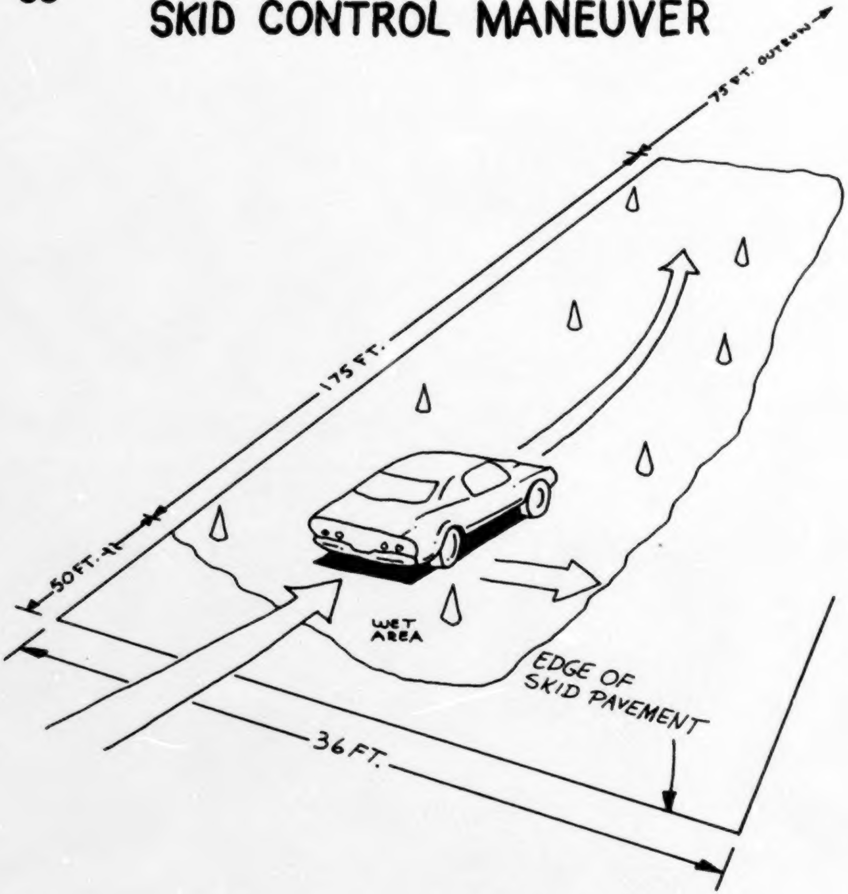
C. Possible Performance Problems:

1. Accelerating to recover from skid.
2. Locking wheels.
3. Excessive countersteering (resulting in further skidding).
4. Steering (to correct skid) in wrong direction.
5. No action taken to recover from skid.

D. Criteria for Excellent Rating (3 Error-Free Runs):

1. Speed: 35 mph.
2. Appropriate skid-control procedures.
3. All cones standing.

SKID CONTROL MANEUVER



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*Skid pad exercises should be performed using only specially-equipped sedans. Vans, modular vehicles, or large trucks should not be used on the skid pad.

**An acceptable, alternate layout for this exercise is five cones (50' apart) down the center of the skid pad. Vehicle operator weaves through the cones; the resulting track is similar to the serpentine.

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